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## CHAPTER 10

# COMBAT SUPPORT OPERATIONS

*For a unit to achieve its full combat potential, the commander must effectively integrate all available combat support assets. This chapter focuses on the CS elements with which the SBCT infantry company is most likely to work: fire support, engineers, air defense, NBC, intelligence, and Army aviation in its CS role. Other CS elements include signal and military police, but the SBCT infantry company is very rarely task organized with those types of units.*

### Section I. COMMAND AND SUPPORT RELATIONSHIPS

The SBCT infantry company commander must understand the command or support relationships established between his company and supporting units.

#### 10-1. COMMAND RELATIONSHIPS

Command responsibility and authority are established routinely through the following standard relationships:

a. **Organic.** This is a unit that forms an essential part of an Army organization and is listed in its table of organization and equipment (TO&E) or table of distribution and allowances (TDA).

b. **Assigned.** This is a unit that is placed in an organization on a permanent basis and is controlled and administered by the organization to which it is assigned.

c. **Attached.** In this relationship, a unit is assigned temporarily to a command other than its parent unit. The attached unit is under the command of the commander of the unit to which it is attached.

(1) The commanding officer exercises the same degree of C2 as with his organic units.

(2) C2 is subject to limitations specified by the commander directing the attachment. This relationship includes the responsibility for logistics, training, operations, and uniform code of military justice; however, the parent unit retains responsibility for transfer and promotion.

(3) Having a unit attached imposes an administrative and logistical burden on the unit to which the attachment is made.

d. **Operational Control.** This relationship places a unit under the control of a commander for specific operations. The relationship is limited by function, time, or location. OPCON does not imply responsibility for administration, logistics, discipline, internal organization, or training. The commander's relationship with OPCON units is otherwise the same as with organic or attached subordinate units.

#### 10-2. SUPPORT RELATIONSHIPS

Support is the action of an element or unit that aids, protects, complements, or sustains another unit IAW an order requiring such support. A supporting unit assists another unit but is not under the command of that unit. The commander's relationship with supporting units is as follows:

- He ensures that the supporting unit establishes liaison and communications with his unit.
  - He keeps the supporting unit informed of the situation and the support needed.
  - The leader of the supporting unit advises him on its employment considerations.
  - A supporting unit honors his request for support as an order. In case of a conflict, the supporting unit leader refers the matter to his parent unit commander. The request or order in question is honored, however, until the conflict is resolved.
- a. **Direct Support.** A unit in DS supports another specific unit but remains under the command of its parent unit commander. The supporting unit answers directly to the supported unit's requests. The company commander may not reallocate, reassign, or task-organize the DS force supporting him.
- b. **General Support.** Units in general support (GS) to the battalion are under control of their parent unit commander. They support the battalion as a whole, not any specific company. Company commanders may request support from the GS unit through the battalion.
- c. **Reinforcing.** Reinforcing is a tactical artillery mission in which an artillery unit augments the fire of another artillery unit. Coordination for support is normally provided through the DS artillery unit.
- d. **General Support Reinforcing.** General support-reinforcing (GS-R) artillery is a tactical artillery mission where an artillery unit has the mission of supporting the force as a whole and of providing reinforcing fires for another artillery unit. Coordination for support is the responsibility of the DS artillery unit.

## Section II. FIRES SUPPORT

Fires and effects are the collective and coordinated use of indirect fire weapons and armed aircraft in support of the battle plan. Fires and effects assets include mortars, field artillery cannons and rockets, and CAS. Fires and effects can be lethal or nonlethal. The integration of fire support assets is critical to the success of the company. The SBCT infantry battalion FSO plans fire (in coordination with the plans developed by the SBCT infantry battalion S3) to support the SBCT infantry battalion commander's concept of the operation. The SBCT infantry company FSO plans company fire support, and the SBCT infantry company commander approves his plan. Fires support planning is the process of analyzing, allocating, and scheduling fires and effects assets.

### 10-3. INDIRECT FIRE CAPABILITIES

The effects of indirect fires on an enemy force are much greater than the effects of the SBCT infantry company's organic weapons. Artillery provides the most destructive, accurate, and flexible combat multiplier the SBCT infantry company commander has. Table 10-1 lists the capabilities of the indirect fire systems that may support an SBCT infantry company.

<b>CALIBER:</b>	<b>60-mm</b>	<b>81-mm</b>	<b>81-mm (im- proved)</b>	<b>120-mm</b>	<b>105-mm</b>	<b>155 -mm</b>	<b>155-mm</b>
<b>MODEL:</b>	M224	M29A1	M252	M285	M119	M198	M109A6
<b>MAX RANGE (HE)(m):</b>	3,490	4,595	5,608	7,200	14,000	18,100	18,100
<b>PLANNING RANGE (m):</b>					11,500	14,600	14,600
<b>PROJECTILE:</b>	HE, WP, ILLUM,	HE, WP, ILLUM,	HE, WP, ILLUM, RP	HE, SMK, ILLUM,	HE M760 ILLUM, HEP-T, APICM, CHEM, RAP	HE, WP, ILLUM, SMK, CHEM, NUC, RAP, FASCAM, CPHD, AP/ DPICM	HE, WP, ILLUM, SMK, CHEM, NUC, RAP, FASCAM, CPHD, AP/ DPICM
<b>MAX RATE OF FIRE:</b>	30 RPM FOR 1 MIN	30 RPM FOR 1 MIN	30 RPM FOR 2 MIN	15 RPM FOR 3 MIN	6 RPM FOR 1 MIN	4 RPM FOR 1 MIN	4 RPM FOR 1 MIN
<b>SUSTAINED RATE OF FIRE (rd/min):</b>	20	8	15	5	3	2	2
<b>MINIMUM RANGE (m):</b>	70	70	83	180	DIRECT FIRE	DIRECT FIRE	DIRECT FIRE
<b>FUZES:</b>	MO	PD, VT, TIME, DLY	PD, VT, TIME, DLY	MO	PD, VT, MTSQ, CP, MT, DLY	PD, VT, CP, MT, MTSQ, DLY	PD, VT, CP, MT, MTSQ, DLY
<b>LEGEND:</b> AP - Armor Piercing APICM - Antipersonnel Improved Conventional Munitions CHEM - Chemical CP - Concrete Piercing CPHD - Copperhead DLY - Delay DPICM - Dual Purpose Improved Conventional Munitions FASCAM - Family of Scatterable Mines HE - High Explosive HEP-T - High Explosive Plastic Tracer ILLUM - Illumination MIN - Minute MO - Multioption - VT, PD, DLY MT - Mechanical Time MTSQ - Mechanical Time Super Quick NUC - Nuclear PD - Point Detonating RAP - Rocket Assisted Projectile RD - Round RP - Red Phosphorus RPM - Rounds per Minute SMK - Smoke TIME - Adjustable Time Delay VT - Variable Time WP - White Phosphorus							

**Table 10-1. Indirect fire capabilities.**

a. Field artillery (FA) can fire a variety of ammunition, including high explosive, illumination, and white phosphorous ammunitions. The 155-mm units also can fire dual-

purpose improved conventional munitions (DPICMs) and scatterable mines (FASCAM). The DPICM is a lethal antipersonnel and antiarmor munition containing bomblets that are dispersed over a wide area because they are ejected high above the target during the flight of the projectile. The bomblets can penetrate up to 4.5 inches of armor. FASCAM rounds contain a number of mines with self-destruct features, which are set to detonate at specific times (Table 10-2). The rounds may contain either antipersonnel or antiarmor mines that arm shortly after impact. Companies do not normally plan or employ FASCAM, but the company commander should be familiar with these weapons. (For more information, see FM 3-21.21 [7-22].)

TYPE OF MINE	ARMING TIME	SELF-DESTRUCT TIMES
Adam (AP)	2 minutes	4 hours or 48 hours
RAAM (AT)	45 seconds	4 hours or 48 hours
GEMSS	45 minutes	5 days or 15 days
MOPMS	2 minutes	4 hours
Gator/Volcano	2 minutes	48 hours or 15 days

**Table 10-2. FASCAM arming and self-destruct times.**

b. Mortars and artillery fire can be combined to cover targets. For example, mortars can fire illumination while artillery fires high explosives or DPICMs. The SBCT infantry company commander must ensure his company employs each system (mortars, artillery, and direct fire) when and where it has the greatest effect on the enemy.

#### **10-4. FIRE SUPPORT PLANNING AND COORDINATION**

SBCT elements conduct fires and effects planning concurrently with maneuver planning at all levels. SBCT infantry battalions typically use top-down fire support planning, with bottom-up refinement of the plans. The commander develops guidance for fires and effects in terms of tasks, purposes, and effects. In turn, the fire support planner determines the method to be used in accomplishing each task. Individual units then incorporate assigned tasks into their fire support plans. In addition, units tasked to initiate fires must refine and rehearse their assigned tasks. The company commander refines his unit's assigned portion of the battalion fire support plan, ensuring that the designated targets will achieve the intended purpose. He also conducts rehearsals to prepare for the mission and, as specified in the plan, directs the company to execute its assigned targets.

##### **a. Terms and Definitions.**

(1) ***Fire Support Planning.*** Fire support planning is the continual process of analyzing, allocating, and scheduling fire support. The goal of fire support planning is to effectively integrate fire support into battle plans to optimize combat power. It is performed as part of the MDMP.

(2) ***Fire Support Coordination.*** Fire support coordination is the continual process of implementing fire support planning and managing the fire support assets that are available to a maneuver force.

(3) ***Fire Planning.*** Fire planning is the continual process of selecting targets on which fires are prearranged to support a phase of the commander's plan.

(4) **Essential Fire Support Task.** An EFST is a task that a fire support element must accomplish in order to support a combined-arms operation. Failure to achieve an EFST may require the commander to alter his tactical or operational plan. A fully developed EFST has a task, purpose, method, and effects (TPME). The task describes what targeting objective (for example, delay, disrupt, limit, or destroy) fires must achieve on an enemy formation's function or capability. The purpose describes why the task contributes to maneuver. The method describes how the task will be accomplished by assigning responsibility to observers or units and delivery assets and providing amplifying information or restrictions. Typically, the method is described by covering three categories: priority, allocation, and restrictions. Effects quantify successful accomplishment of the task.

(5) **Concept of Fires.** The concept of fires is the logical sequence of EFSTs, integrated with the scheme of maneuver, that will accomplish the mission and achieve the commander's intent. It allocates in broad terms the fire support assets needed to achieve the EFSTs. The concept of fires is the basis of the fires paragraph in the OPORD.

(6) **Scheme of Fires.** The scheme of fires is the detailed, logical sequence of targets and fire support events the fire support element uses to find and attack high-payoff targets (HPTs). It details how to execute the fire support plan in accordance with the time and space of the battlefield to accomplish the commander's EFSTs. The products of the fire support annex--fire support execution matrix (FSEM), target list/overlay, and or a target synchronization matrix (TSM)--articulate the scheme of fires.

b. **Linking Tasks and Maneuver Purpose.** A clearly defined maneuver purpose enables the maneuver commander to articulate precisely how he wants fires and effects to affect the enemy during different phases of the battle. This, in turn, allows fires and effects planners to develop a fires and effects plan that effectively supports the intended purpose. The planners can determine each required task (in terms of effects on target), the best method for accomplishing each task (in terms of a fires and effects asset and its fire capabilities), and a means of quantifying accomplishment. A carefully developed method of fire is equally valuable during execution of the fires and effects mission; it assists not only the firing elements but also the observers who are responsible for monitoring the effects of the indirect fires. With a clear understanding of the intended target effects, fires and effects assets and observers can work together effectively, planning and adjusting the fires as necessary to achieve the desired effects on the enemy. The following paragraphs describe several types of targeting objectives associated with fires and effects tasks and provide examples of how the SBCT infantry company commander might link a target task to a specific maneuver purpose in his order.

(1) **Delay.** The friendly force uses indirect fires to cause a particular function or action to occur later than the enemy desires. For example, the commander might direct delaying fires this way: "Delay the repositioning of the enemy's reserve, allowing B Company to consolidate on OBJECTIVE BOB."

(2) **Disrupt.** Disrupting fires are employed to break apart the enemy's formation; to interrupt or delay his tempo and operational timetable; to cause premature commitment of his forces; or to otherwise force him to stage his attack piecemeal. An example of the commander's direction might be: "Disrupt the easternmost lead motorized battalion to prevent the enemy from massing two battalions against Alpha and Charlie."

(3) **Limit.** Indirect fires are used to prevent an action or function from being executed where the enemy wants it to occur. An example of the commander's direction might be: "Limit the ability of the enemy's advance guard to establish a firing line on the ridge line to the flank of the battalion axis of advance to prevent the enemy from fixing the battalion main body."

(4) **Destroy.** The friendly force uses indirect fires to render an enemy formation ineffective. For example, the commander might direct destroying fires this way: "Destroy enemy platoon on OBJ HARRY in order to allow the main effort to assault OBJ TOM."

(5) **Divert.** Diverting fires are employed to cause the enemy to modify his course or route of attack. An example of the commander's direction might be: "Divert the enemy's combined arms reserve counterattack to EA DOG to facilitate its destruction by Delta."

(6) **Screen.** Screening fires entail the use of smoke to mask friendly installations, positions, or maneuver. They normally are conducted for a specified event or a specified period of time. An example of the commander's direction might be: "Screen the movement of the counterattack force (B Company) along ROUTE RED to attack by fire (ABF) position 21 to prevent the remnants of the enemy battalion from engaging the company."

(7) **Obscure.** Smoke is placed between enemy forces and friendly forces or directly on enemy positions to confuse and disorient the enemy's direct fire gunners and artillery FOs. Obscuration fires are normally conducted for a specified event or a specified period of time. An example of the commander's direction might be: "Obscure the northernmost company to protect our breach force until the breach site is secured."

**NOTE:** The supported commander also may designate purposes for special munitions such as area denial artillery munition (ADAM)/remote antiarmor munition (RAAM), Copperhead, or illumination rounds.

c. **Final Protective Fire Planning.** FPF planning is designed to create a final barrier, or "steel curtain", to prevent a dismounted enemy from moving across defensive lines. These are fires of last resort and as such they take priority over all other fires, to include priority targets. The employment of FPFs presents several potential problems. They are linear fires, with coverage dependent on the firing sheaf of the fires and effects asset(s). In addition, while an FPF may create a barrier against penetration by enemy infantry, armored vehicles may simply button up and move through the fires into the friendly defensive position. FPFs are planned targets and thus must have a clearly defined purpose. FPF planning normally is delegated to the SBCT infantry company that is allocated the support.

d. **Target Refinement.** The SBCT infantry company commander is responsible for the employment of indirect fires in his zone or sector. The most critical aspect of this responsibility is target refinement, in which he makes necessary changes to the fires and effects plan to ensure that targets accomplish the SBCT infantry battalion or SBCT commander's intended battlefield purpose. Rather than merely executing targets without regard to the actual enemy situation, the company commander and FSO must be ready to adjust existing targets or to nominate new targets that allow engagement of specific enemy forces.

(1) Necessary refinements usually emerge when the SBCT infantry company commander conducts war gaming as part of step 6 (complete the plan) of troop-leading procedures. The war gaming process allows him to identify required additions, deletions, and adjustments to the SBCT infantry battalion fires support plan. The company FSO then submits the refinements to the battalion FSE for inclusion in the scheme of fires for the operation. (This normally is only the first step of target refinement, with the commander and FSO making further adjustments as the enemy situation becomes clearer.)

(2) As a specific requirement in defensive planning, the company commander must focus on target refinement for the ground he will "own" during the operation. This usually takes place as part of engagement area development. The commander makes appropriate adjustments to the targets based on refinements to the SITEMP, such as the actual positions of obstacles and enemy direct fire systems.

(3) Because fires and effects are planned from the top down, cutoff times for target nomination and target refinement normally are specified in the battalion OPORD. Commanders must ensure that nominations and refinements meet these deadlines to provide fire support planners with sufficient time to develop execution plans.

e. **Fires Support Preparation.** As noted, although the SBCT infantry battalion and SBCT commanders establish target tasks and purposes and allocate appropriate fires and effects assets, the SBCT infantry company commander is the one who must ensure execution of assigned targets. In turn, successful execution demands thorough preparation, focusing on areas covered in the following paragraphs.

(1) **Observation Plan.** In developing the observation plan, the commander must ensure that both primary and alternate observers cover all targets. The plan must provide clear, precise guidance for the observers. Perhaps the most important aspect of the plan is positioning: observers' positions must allow them to see the trigger for initiating fires as well as the target area and the enemy force on which the target is oriented. The commander must also consider other aspects of observer capabilities, including available equipment. For example, the ground/vehicle laser locator designator (G/VLLD) provides first round fire-for-effect capability; without it, observers may have to use adjust-fire techniques that take longer and are more difficult to implement. The observation plan also must include contingency plans that cover limited visibility conditions and backup communications.

**NOTE:** In addition to providing the specific guidance outlined in the observation plan, the commander must ensure that each observer understands the target task and purpose for which he is responsible. For example, observers must understand that once the first round impacts, the original target location is of no consequence; rather, they must orient on the targeted enemy force to ensure that fires achieve the intended battlefield purpose.

(2) **Rehearsals.** The SBCT infantry company commander is responsible for involving his FSO in company- and battalion-level rehearsals, for making the company available for any separate fires and effects rehearsals, and for rehearsing the company's FOs in the execution of targets. He also should use rehearsals to ensure that the company's primary and backup communications systems will adequately support the plan.

(3) **Target Adjustment.** In the defense, the commander should confirm target location by adjusting fires as part of engagement area development.

(4) **Trigger Planning.** The company commander develops a trigger for each target. The trigger can be a point on the ground (such as an easily recognizable terrain feature), an emplaced marker, or a designated linear control measure. In the defense, triggers should be marked physically on the ground or their location specifically selected and identified during the development of the engagement area.

**NOTE:** Triggers can be marked using techniques similar to those for marking TRPs.

(a) The trigger line or point must be tied to clearly understood engagement criteria associated with the targeted enemy force. As an example, the company commander might use the following order to begin indirect fires: "Initiate target AE0001 when approximately 30 APCs and 10 tanks cross TRIGGER LINE ORANGE."

(b) Several factors govern the positioning of the trigger. Especially critical factors are the enemy's rate of travel and the resulting time required for the enemy force to move from the trigger to the target area. Using this information, the commander can then select the trigger location based on the following considerations:

- The amount of time required to initiate the call for fire.
- The time needed by the fires and effects element to prepare for and fire the mission.
- The time required to clear the fires.
- Any built-in or planned delays in the firing sequence.
- The time of flight of the indirect fire rounds.
- Possible adjustment times.

The SBCT infantry company commander can use the information in Tables 10-3 and 10-4 as he completes the process of determining the location of the trigger in relation to the target area. Table 10-3 lists the time required for the enemy force to move a specified distance at a specified rate of march. Table 10-4 lists the response time required by field artillery assets to prepare for and fire various types of support missions.

RATE OF MARCH	DISTANCE TRAVELED									
	1 km	2 km	3 km	4 km	5 km	6 km	7 km	8 km	9 km	10 km
60 km/hr	1	2	3	4	5	6	7	8	9	10
50 km/hr	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12
40 km/hr	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
30 km/hr	2	4	6	8	10	12	14	16	18	20
25 km/hr	2.4	4.8	7.2	9.6	12	14.4	16.8	19.2	21.6	24
20 km/hr	3	6	9	12	15	18	21	24	27	30
15 km/hr	4	8	12	16	20	24	28	32	36	40
10 km/hr	6	12	18	24	30	36	42	48	54	60
5 km/hr	12	24	36	48	60	72	84	96	108	120

**Table 10-3. Time (in minutes) required to travel a specified distance.**



<b>GRID OR POLAR MISSION (UNPLANNED)</b>	5-7 minutes
<b>PREPLANNED MISSION</b>	3 minutes
<b>PREPLANNED PRIORITY MISSION</b>	1-2 minutes
<b>NOTE:</b> These are approximate times (based on ARTEP standards) needed to process and execute calls for fire on normal artillery targets. Special missions may take longer.	

**Table 10-4. Artillery response times.**

(5) ***Lifting and Shifting Fires.*** As in trigger planning for the initiation of fires, the commander must establish triggers for lifting and shifting fires based on battlefield events such as the movement of enemy or friendly forces. One technique is the use of a minimum safe line (MSL) when a friendly element, such as a breach force, is moving toward an area of indirect fires. As the element approaches the MSL, observers call for fires to be lifted or shifted, allowing the friendly force to move safely in the danger area.

(6) ***Clearance of Fire.*** The maneuver commander has the final authority to approve (clear) fires and their effects within his zone or sector. Although he may delegate authority to coordinate and clear fires to his FSO, the ultimate responsibility belongs to the SBCT infantry company commander. Normally, the FSO assists the commander by making recommendations on the clearance of fires.

(7) ***Fires Support Execution Matrix.*** As a tool in fires support planning and execution, the company commander may develop a graphic summary outlining the critical elements of the fires and effects plan and the company's role in it. The commander can incorporate this information into his own execution matrix or into a separate fires and effects execution matrix, similar to the battalion's fire support execution matrix as illustrated in Table 10-5, page 10-10. The company fire support execution matrix is similar and should include, as a minimum, the following information for each target:

- Target number and type, to include FPF designation.
- Allocated fires and effects asset and munition type.
- Observer and backup observer.
- Trigger.
- Target purpose.
- Target grid.
- Priority of fire.
- Priority targets.
- Fire support coordination measures (FSCMs).

<b>EVENT SUPPORT DATA</b>	<b>EVENT I</b> (LD to SBF 01)	<b>EVENT II</b> (Set conditions for breach from SBF 01)	<b>EVENT III</b> (B Company breach)	<b>EVENT IV</b> (C Company assault)
<b>TARGET/ GRID</b>	AE0001 (PK 10184938).	AE0002 (PK 09005031).	O/O shift AE0001 to AE0003 (PK 10204810) and lift AE0002.	O/O lift AE0003.
<b>ASSET</b>	155-mm HE.	Mortar smoke.	155-mm.	155-mm.
<b>OBSERVER/ BACKUP</b>	Recon platoon will initially call for and adjust fires; FSO adjusts upon arrival at SBF; 1st platoon leader is backup.	FSO (primary)/ 1st platoon leader (backup).	AE0003: FSO (primary)/ 2d platoon leader (backup).	FSO (primary)/ 3d platoon leader (backup).
<b>TRIGGER</b>	C Company crosses PL LYNX.	On-call at SBF.	B Company crosses PL LION.	C Company completes consolidation on OBJ BOB.
<b>PURPOSE</b>	Disrupt enemy on OBJ BOB to facilitate maneuver of A Company to SBF position.	Obscure enemy to prevent interference with B Company's breach.	Disrupt MRB reserve to protect the assault force (C Company).	Protect the assault force (C Company).

**Table 10-5. Example battalion fire support execution matrix.**

### 10-5. MANEUVER COMMANDER'S INTENT

The SBCT infantry company commander ensures the FSO clearly understands the intent for maneuver and fires and effects. He identifies the role of fires and effects in the scheme of maneuver (when, where, what, and why) by explaining in detail the concept of the operation, scheme of maneuver, and tasks for fires and effects to the FSO.

a. Providing this level of guidance is not easy. Artillery fires are not instantaneous, and planning must allow for this lag time. It takes several minutes to process targets of opportunity and deliver fires in the target area. While war-gaming the maneuver, the company commander refines the critical targets or EAs, priority of targets, priority of engagement, sequence of fires, and results desired. He then can see when and how to synchronize direct and indirect fires to destroy the enemy and protect the force.

b. The company commander normally designates the company's main effort to have priority of fires. This prioritizes requests when two or more units want fires at the same time. It should be noted that an element can still request fires even if it has not been allocated priority of fires. He also designates where to place obscuration or illumination, suppressive fires, and preparation fires.

## 10-6. PLANNING PROCESS

While the SBCT infantry company commander develops and refines the tactical plan, the FSO concurrently develops and refines the fire support portion of that plan. The FSO does not wait for the commander to complete the scheme of maneuver; he builds the fire plan using deliberate or quick fires and effects planning, depending on the time available. In either case, targets must be placed in the fire support planning channels as soon as possible so they can be processed at the battalion FSE or battery FDC (Figure 10-1). Regardless of which planning method is used, the company fire support plan must include:

- Target number and location.
- A description of the expected target.
- Primary and alternate persons responsible for shooting each target.
- The effect required (destroy, suppress, neutralize) and purpose.
- Radio frequency and call sign to use in requesting fires.
- When to engage the target.
- Priority of fires and shifting of priority.
- Size, location, code word, and emergency signal to begin FPF.

Other information may be included as necessary or appropriate.

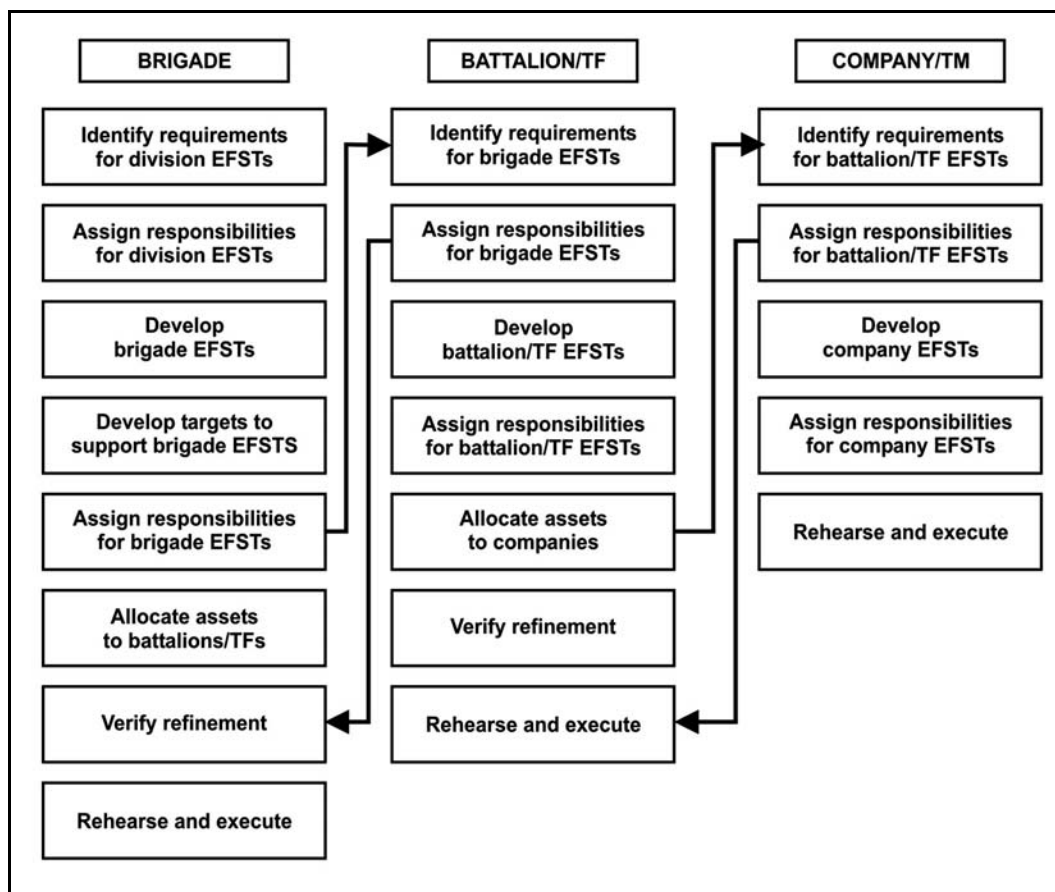


Figure 10-1. The fire planning process

a. The company FSO does most of the company fire support planning; however, he may receive targets and target information from platoon leaders and the battalion FSO. The company commander and FSO should not plan too many targets.

(1) The number of targets planned by the company and included in the formal fires and effects plan depends upon the company's priority for fire support and the number of targets allocated to them. The total number of targets in the fire support plan or the battalion mortar plan may be constrained. An excessive number of targets tends to dilute the focus of fire planning and can lead to increases in response time.

(2) Informal planning continues with target locations being recorded on terrain sketches or the FSO's map or being stored in the buffer group of the advanced field artillery tactical data system (AFATDS) for quick reference and transmission. Fire planning for the company mortars should complement these plans; the primary constraint normally is ammunition availability and the rapid resupply ability. Care must be taken to ensure that planning focuses on the critical fires and effects requirements identified by the company commander.

b. The company FSO completes the indirect fire plan and briefs the company commander. The company commander may alter the plan or approve it as is, but he makes the final decision. After the company commander approves the plan, the FSO makes sure the targets are passed to the battalion FSE where the fire plans are integrated into the battalion scheme of maneuver.

c. The FSO ensures platoon leaders are thoroughly familiar with the indirect fire plan. He also provides target overlays to the platoon leaders, forward observers, and the commander. He also may disseminate the company fire support plan as a target list and a fires and effects execution matrix. The FSO does this in sufficient time to allow subordinates to brief their platoons and sections. (A good plan given with the company order is better than a perfect plan handed out at the line of departure.)

(1) **The Fires Paragraph.** As a subparagraph to the concept of operations, the fires paragraph describes the concept of fires that, along with the scheme of maneuver, communicates how the force as a whole will achieve the commander's intent. It must clearly describe the logical sequence of EFSTs and how they contribute to the concept of operations. The overall paragraph organization should mirror that of the scheme of maneuver paragraph. If the maneuver paragraph is phased or otherwise organized, the fires paragraph will take on the same organization.

(2) **Task, Purpose, Method, and Effects.** The internal format for the fires paragraph uses the four subcategories of TPME. Within each phase of an operation, each EFST will be described in the sequence of planned execution using TPME. The fires paragraph must be concise but specific enough to clearly state what fires are to accomplish in the operation. The information required in each subcategory is outlined below.

(a) **Task.** Task describes the targeting objective fires must achieve against a specific enemy formation's function or capability. These formations are HPTs or contain one or more HPT. Task is normally expressed in terms of objective, formation, and function.

- **Objective.** Clearly describes the targeting objectives that must be achieved. Use terms such as destroy, disrupt, delay, limit or any other terms that describe the effects required.
- **Formation.** A specific element or subelement of the enemy. This can specify a specific vehicle type or target category as long as the element or subelement is clear.
- **Function.** A capability of the formation that is needed for it (the enemy formation) to achieve its primary task and purpose.

(b) *Purpose.* Purpose describes the maneuver or operational reason for the task. This should identify as specifically as possible the friendly maneuver formation that will benefit from the targeting objective and describe in space and time what the objective will accomplish.

<b>EXAMPLE</b>		
<b><u>TASK AND PURPOSE</u></b>		
<b>Objective</b>	<b>Formation</b>	<b>Function</b>
Disrupt the ability of	the motorized infantry platoon at point of penetration	to place effective direct fire against the breach force...
...to allow an SBCT infantry rifle company to breach the obstacle without becoming decisively engaged by the motorized infantry platoon at the point of penetration		

(c) *Method.* Method describes how the task and purpose will be achieved. It ties the “detect” function to the “deliver” function in time and space and describes how to accomplish the task. Method normally is described in terms of priority, allocation, and restriction.

- **Priority.** For detection assets, it assigns priorities for finding NAIs, targeted areas of interest (TAIs), EAs, and or HPTs. For deliver assets, it assigns the priority of the HPT that system primarily will be used against.
- **Allocation.** For both detection and deliver assets, it describes the allocation of assets to accomplish the EFST.
- **Restriction.** Describes constraints--either requirements to do something or prohibition on action. Considerations include ammunition restrictions and FSCMs.

The method subparagraph includes the following information:

- Priority of fires (POFs).
- Observers (primary/alternate).
- Triggers.
- Target allocation.
- Priority targets.

- CAS allocations.
- FPFs.
- Restrictions.
- Special munitions.
- Intelligence and electronic warfare assets.
- Any other instructions.

**EXAMPLE****METHOD**

FA POF to 1st platoon, mortar POF to 2d platoon. Primary observer for AB1000 (motorized infantry platoon at point of penetration) is 1st platoon from OP 1, NFA 1. Alternate observer is company FIST, NFA 3...no DPICM within 300 meters NP177368....airspace coordination area (ACA) Lion in effect when CAS at initial point....

(d) *Effects*. Effects attempt to quantify the successful accomplishment of the task. They provide a guide to determine when the task is completed. One measure is to determine if the purpose has been met. If multiple delivery assets are involved, it helps clarify what each must accomplish. Effects determination also provides the basis for the assess function of targeting and contributes to the decision of whether to re-attack the target.

**EXAMPLE****EFFECTS**

No hostile fire on the breach force from enemy motorized infantry platoon until at least the assault force has passed through.  
**25 percent of vehicles and 50 percent of enemy motorized infantry platoon destroyed.**

**NOTE:** At battalion and below, a formal written OPORD may not be produced. A fire support plan at this level may be an operations overlay with written instructions, an FSEM, and a target list/overlay.

d. Battalion fire support plans may be distributed in matrix format. The fire support execution matrix is a concise, effective tool showing the many factors of a detailed plan. It may aid the company FSO and the commander in understanding how the indirect fire plan supports the scheme of maneuver. It explains what aspects of the fires and effects plan each element is responsible for, and at what time during the battle these aspects apply. (For more information on the battalion fire support matrix, see FM 3-21.21 [7-22].)

(1) The advantage of the matrix is that it reduces the plan to one page and simplifies it. The company fire support execution matrix (Figure 10-2) also directs execution

responsibilities and reduces the possibility that planned fires will not be executed. Dissemination of the fire plan is the responsibility of the company commander. The commander and his key subordinate leaders must understand the categories of targets and how to engage those targets to create the desired result.

(2) Figure 10-2, page 10-16, is an example of a completed fire support execution matrix for a company deliberate attack. In the AA, a field artillery FPF is allocated for 1st and 2d platoons; 3d platoon has been allocated a mortar FPF; 2d platoon has priority of mortar fires from the LD to Checkpoint 7. From Checkpoint 7 to Objective Green, 3d platoon has been allocated a mortar priority target and has designated it as CA3017; 2d platoon is backup for execution. 1st platoon has been allocated a mortar FPF; 2d and 3d platoons have been allocated field artillery FPFs. At company level, information in each box of the matrix includes the following:

(a) Priorities of indirect fire support to a platoon appear in the upper left corner of the appropriate box (FA).

(b) If a unit is allocated an FPF, the type of indirect fire means responsible for firing appears next to the indicator (FA FPF or MTR FPF).

(c) The target number of priority targets allocated to a platoon appear in the box preceded by the target, followed by the target number (MORT PRI TGT CA3014).

(d) If the company FSO is responsible for initiating specific fires, the target number, group, or series designation is listed in the box for the FSO (CA3012). Specific guidelines concerning fires not included on the target list are included in that box.

(e) Alternate element responsible for the execution of specific fires is listed in the lower right hand corner of the box (2d platoon). If fires have not been initiated when they were supposed to have been, that unit initiates them (unless ordered not to).

(f) Each fire support measure to be placed in effect, followed by a word designated for the measure, is shown in the box (CFL CHUCK). For airspace coordination areas, the time for the arrival of the planned CAS or attack helicopters is listed (ACA 1400Z).

(g) Other factors that apply to a certain platoon during a specific time may be included in the appropriate box. General guidance is issued in the written portion of the operation order.

	AA	LD	CP7	OBJ GREEN
FSO	INITIAL PREP 1ST PLT	FIRE CA 3012 CFL CHUCK 2D PLT	FIRE C1A GROUP 3D PLT	ACS (CAS) 1400Z
1ST PLT	FA FPF	CFL CHUCK		MORTAR FPF
2D PLT	FA FPF	MORT PRI TGT CA 3014 CFL CHUCK		FA FPF
3D PLT	MORTAR FPF	CFL CHUCK	MORT PRI TGT CA 3017 2D PLT	FA FPF

**Figure 10-2. Example SBCT infantry company fire support execution matrix.**

### 10-7. TARGETS

A target can be personnel, vehicles, materiel, or terrain that is designated and numbered for reference or firing. Every target can be classified as either a target of opportunity (appears during combat, no attack has been planned) or a planned target (fire is prearranged). Individually planned targets may be further subdivided into either scheduled or on-call targets. A scheduled target is a planned target to be attacked at a specified time. An on-call target is a planned target on which fire is delivered when requested.

a. A priority target is one that could decisively affect the unit mission. The SBCT commander may allocate artillery priority targets to battalions. The battalion commander may in turn allocate priority targets to his subordinate infantry companies. Normally, the company commander designates company priority targets (with recommendations provided by the FSO).

b. When the battalion commander designates priority targets, he provides specific guidance to the FSO and his subordinate companies as to when certain targets become priority targets, when they cease to be priority targets, the desired effects on the targets, and any special type of ammunition to be used. Firing units lay the guns on priority targets when they are not engaged in a fire mission, which reduces reaction time. FPF is an example of a priority target in a defensive situation.

c. The company FSO assigns a target number to each planned target. Blocks of alphanumeric target numbers (two letters and four numbers) are provided for all fire-planning agencies. These serve as an index to all other information regarding a particular target, such as location, description, and size. The company FSO assigns target numbers to any TRPs the company designates. Mortar sections have blocks of target numbers so they can assign a target number when an observer directs "record as target" upon completion of a registration.



d. A standard target is an area about 200 meters in width. The symbol for a standard target is a cross. It may be canted if several targets are close to each other or if the symbol might be mistaken as a grid intersection. The intersection of the lines marks the center of the target. The target list describes the nature of the target and other pertinent information. (This applies to targets planned for conventional and improved conventional ammunition.)

(1) **Offensive Application.** Use offensive application targets to attack known, suspected, or likely enemy positions such as OPs, antitank sites, road intersections, or terrain that dominates attack axes.

(2) **Defensive Application.** Use defensive application targets to destroy the enemy as he attacks. Plan targets at fording sites, bridges, narrow defiles restricting movement, road intersections, obstacles, and possible overmatch positions.

e. When the expected target will be moving, extra planning is required. Determine a trigger point that allows a designated observer sufficient time to initiate the call for fire, the firing unit time to prepare and fire, and the projectiles time to reach the target. The observer calls for fire as the unit or vehicles reach the trigger point and the enemy continues moving to the target. If timed properly, enemy and projectiles arrive at the target at the same time.

## 10-8. FINAL PROTECTIVE FIRES

FPFs are immediately available planned fires that block enemy movement, especially dismounted infantry approaching defensive lines or areas. These areas are integrated with defensive plans. The pattern of FPF plans may be varied to suit the tactical situation; they are drawn to scale on the target overlay. The size of the FPF is determined by the number and type of weapon used to fire on it (Figure 10-3, page 10-18). The company commander is responsible for the precise location of FPFs. The company FSO--

- Reports the desired location of the FPF to the supporting FDC.
- Adjusts indirect fire on the desired location, by weapon.
- Transmits the call to fire FPF to the supporting FDC.

The leader (normally the company commander or a platoon leader) in whose area the FPF is located has the authority to call for the FPF. The FPF has the highest priority of any target assigned to a fires and effects means. The FPF is only fired when required to repel the enemy's assault. Premature firing wastes ammunition and allows the enemy to avoid the impact area.

WEAPONS	SIZE (METERS)
60-mm Mortar (2 tubes).....	60 x 30
81-mm Mortar (4 tubes).....	100 x 40
120-mm Mortar (2 tubes).....	120 x 60
120-mm Mortar (4 tubes).....	240 x 60
155-mm Howitzer (4 guns).....	200 x 50
155-mm Howitzer (6 guns).....	300 x 50
155-mm Howitzer (8 guns).....	400 x 50

Figure 10-3. FPF dimensions

### 10-9. SPECIAL MUNITIONS

Obscuration fires use smoke and white phosphorus ammunition to degrade the enemy by obscuring his view of the battlefield. (High explosive ammunition may also obscure his view with dust and fires, but the unit should not rely on it as the primary means.) Because smoke is subject to changes in wind direction and terrain contours, its use must be coordinated with other friendly units affected by the operation. Used properly, obscuration fires can--

- Slow enemy vehicles to blackout speeds.
- Obscure the vision of enemy direct fire weapon crews.
- Reduce accuracy of enemy-observed fires by obscuring OPs and CPs.
- Cause confusion and apprehension among enemy soldiers.
- Limit the effectiveness of the enemy's visual command and control signals.

a. Screening fires are closely related to obscuration fires; they also involve the use of smoke and WP. However, screening fires mask friendly maneuver elements to disguise the nature of their operations. For example, they are used to screen river crossings for an enveloping force. Screening fires may assist in consolidating on an objective by placing smoke in areas beyond the objective. They also may be used to deceive the enemy into believing that a unit is maneuvering when it is not. Screening fires require the same precautions as obscuration fires.

b. Special munitions may be used for illumination, which may be scheduled or on-call. Use friendly direct fire weapons and adjustment of indirect fires to illuminate areas of suspected enemy movement or to orient moving units.

### 10-10. SMOKE SUPPORT

Internal smoke capabilities consist of company mortars and smoke pots. Smoke pots are the commander's primary means of producing small-area screening smoke. An external smoke platoon is required for long-term, large-area obscuration. If attached, the smoke platoon has the capability of providing both hasty smoke and large-area smoke support for tactical operations in the main battle area.

### 10-11. OBSERVER POSITIONS

To ensure that indirect fire can be called on a specific target, observers must be designated and in the proper position. As the company plans indirect fire targets to support the operation and passes these down to the platoon, specific observers are positioned to observe the target and the associated trigger line or TRP. Any soldier can perform this function as long as he understands the mission and has the communications capability and training.

a. Once the target has been passed to the platoon or included by the platoon in the fire support plan, the platoon leader must position the observer and make sure he understands the following in precise terms:

- (1) The nature and description of the target he is expected to engage.
- (2) The terminal effects required (destroy, delay, disrupt, limit, and so on) and purpose.
- (3) The communications means, radio net, call signs, and FDC to be called.
- (4) When or under what circumstances targets are to be engaged.
- (5) The relative priority of targets.

(6) The method of engagement and method of control to be used in the call for fire.

(a) *Method of Engagement (Adjust Fire or Fire for Effect)*. Anticipate the need to adjust fires when deriving target location strictly through map-spot procedures. Using this technique, expect target location errors of up to 500 meters. Employ fire for effect when the target can be precisely located through previous adjustment, target area survey, or the use of laser range finders from known locations. When fires must be adjusted, consider the additional time required to complete the fire mission (two to four minutes for each adjustment) in the planning process.

(b) *Method of Control (Time on Target, At My Command, or When Ready)*. The method of control should reflect the degree of synchronization required. While time-on-target controls the precise timing of fires, it reduces flexibility in the firing units and can result in fewer missions being fired over a given period of time.

b. If the observer cannot be positioned to see the target and trigger line or TRP under the visibility conditions expected at the time the target is to be fired, the headquarters that planned the target must be notified and a new target must be planned at a location that will meet the commander's purpose for fire support.

c. There are three observer communications options available to the company. After considering the tactical situation, the degree of training, and the availability of fire support assets, the commander determines which option is best suited to the mission. Under all options, the company FSO monitors all calls for fire.

(1) **Option 1 (Decentralized)**. The observer sends his call for fire directly to the fire support assets available to support his operation. This option gives him the most responsive fires; however, it allows the FIST HQ the least amount of control. Since the observer is allowed to determine which asset should engage each target, this option generally requires a highly trained observer and company FSO.

(2) **Option 2 (Predesignated)**. The observer is assigned a particular fire support asset from which he may request fire support, and he operates on that unit's net. If the observer thinks his target should be engaged with a different fire support asset, he must request permission from the FIST HQ to change assets. Permission is granted on a mission-by-mission basis. Under this option, fire support is highly responsive if the asset is suitable to the type of target.

(3) **Option 3 (Centralized)**. The observer must contact the FIST HQ for each call for fire. The FIST HQ refers the observer or relays his request to an appropriate fire support asset. This option is least responsive for the observer, but it offers the highest degree of control to the FIST HQ. This option generally is used when maneuver personnel are observers for their platoon.

(4) **Tailoring**. Since the level of training and the tactical situation vary for each observer, the company FSO may assign each observer under his control an appropriate option. For example, the 1st Platoon FO may be decentralized, the 2nd Platoon FO may be predesignated, and the 3rd Platoon FO may be centralized.

## 10-12. REHEARSALS AND EXECUTION

Once the company has developed and coordinated the fire support plan, it should rehearse the plan. As the company rehearses the maneuver, it rehearses the fire plan. The target list is executed as the maneuver is conducted; fires are requested (though not actually executed by the firing units) just as they would be during the operations. Under ideal

circumstances, an FPF can be adjusted during the rehearsal. Rehearsals on the terrain reveal any problems in visibility, communications, and coordination of the fires and effects plan. Conduct rehearsals under degraded conditions (at night and in MOPP4) to make sure the company can execute the plan in all circumstances.

a. If time or conditions do not permit full-scale rehearsals, key leaders can meet, preferably at a good vantage point, and brief back the plan. They can use a sand table depiction of the terrain. Each player explains what he does, where he does it, and how he plans to overcome key-leader casualties. The fires and effects plan execution is integral to this process and is rehearsed in exactly the same way.

b. The company executes the fire plan as it conducts the operation. It fires targets as required and makes adjustments based on enemy reactions. Priority targets are cancelled as friendly units pass them or they are no longer relevant to the maneuver.

### **10-13. COMMUNICATIONS**

The FSO can monitor three of four possible radio voice nets and three digital nets (Figure 10-4). The company's mission and priority determine the specific nets.

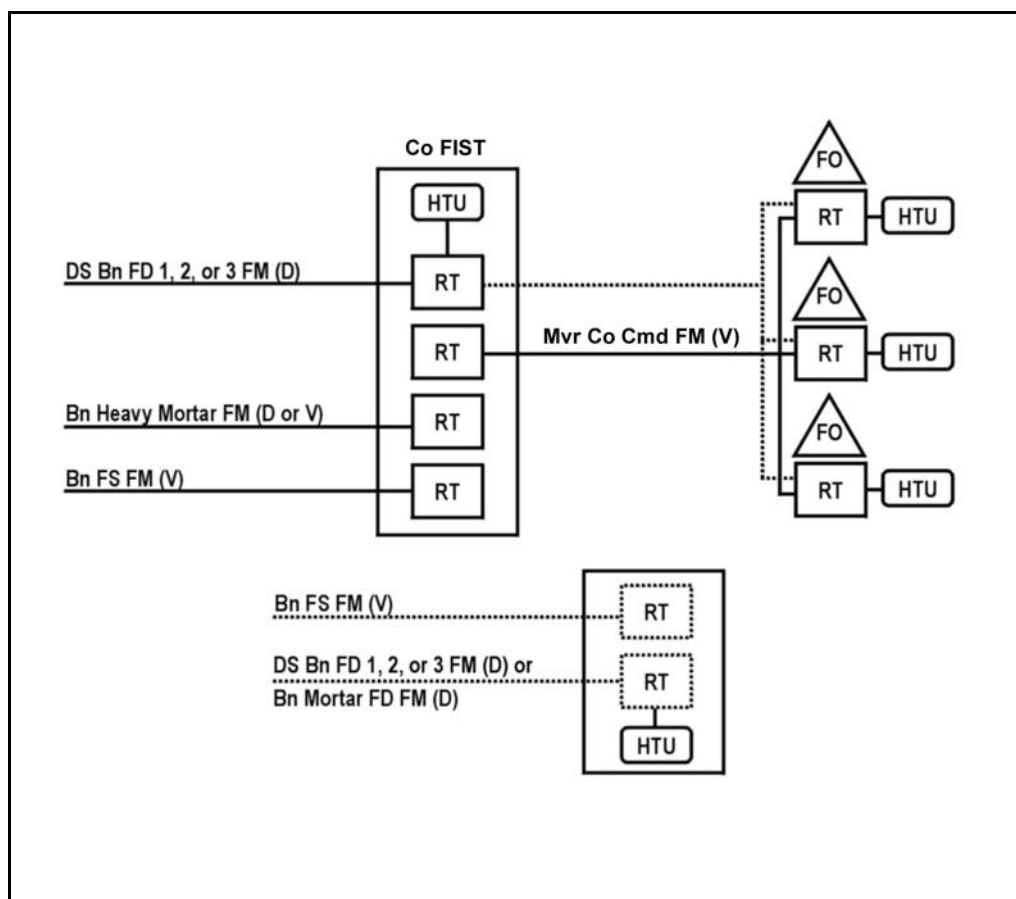
a. **Company Command Net FM (Voice) and FBCB2 (Digital).** Platoon leaders, the XO, and attachments use this net to send reports, receive instructions, and request fires. Any Strikers attached to the company monitor this net. This net also allows the FIST to monitor company operations and links it to the company commander, platoon leaders, and observers for planning and coordination. The company headquarters is the net control station (NCS).

b. **Battalion Mortar Fire Direction Net FM (Voice).** Observers may use this net to request fires of the battalion mortar platoon. Other stations on the net include the FIST headquarters and the battalion FSE. The battalion mortar platoon is the NCS.

c. **Battalion Mortar Fire Direction Net (Digital).** As necessary, the FIST sends fire missions to the supporting mortar platoon or section using this net.

d. **Company Mortar Net (Voice).** Observers or the company FSO use this net to request fire from the company mortars.

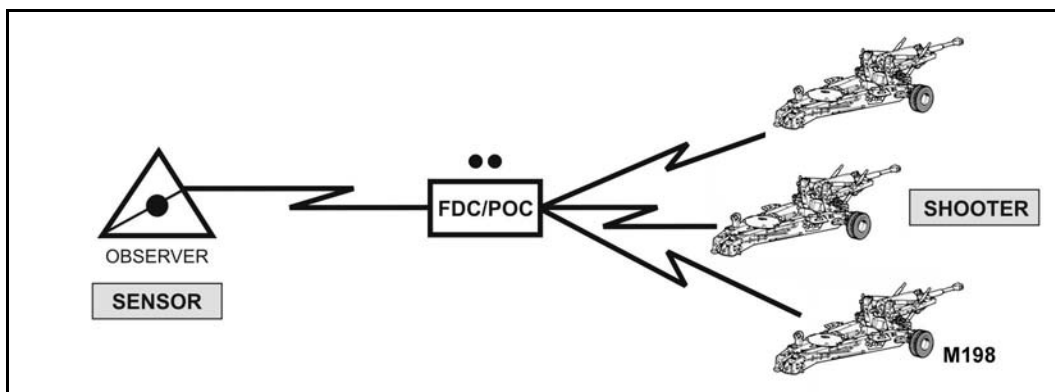
e. **Direct Support Battalion Fire Direction Net FM (Voice) and Digital.** This net is used for FA fire direction. The FIST uses this net to relay calls for fire through the battalion FSE to supporting artillery assets. The direct support battalion FDC is the NCS. When a Striker is present, it uses this net to request FA fires. The battery FDC and battalion FSE also are on this net.



**Figure 10-4. Company FIST communications.**

#### **10-14. QUICK FIRE CHANNEL**

A quick fire channel is established to link an observer (or other target executor) directly with a weapon system (Figure 10-5, page 10-22). Quick fire channels may be either voice or digital nets. Quick fire channels within a maneuver brigade normally are established on FA or mortar nets. These channels are designed to expedite calls for fire against HPTs or to trigger preplanned fires. Quick fire channels also may be used to execute fires for critical operations or phases of the battle and to link an observer with a battery or platoon FDC for counter reconnaissance fires. Copperhead missions can best be executed by using quick fire channels. The fire support coordinator and or FSOs establish quick fire channels and procedures based on the commander's intent and the concept of operations.



**Figure 10-5. Quick fire channel illustrating sensor-to-shooter link.**

### 10-15. INDIRECT FIRES IN CLOSE SUPPORT

Effective indirect fires and effects often require artillery and mortar fires near friendly infantry soldiers. A safe integration of fires and maneuver this close demands careful planning, coordination, and knowledge of the supporting weapons. These close supporting fires are most commonly FPFs in a defensive operation or are suppression or obscuration fires to support an assault on an enemy position. When planning these fires, the company commander considers--

a. **The Effect Required.** In the defense, this may be to destroy enemy soldiers and to degrade the effectiveness of enemy vehicles by causing them to fight buttoned-up. In the attack, the suppression/obscuration of enemy positions to allow the breach and seizure of a foothold on the objective is probably the desired effect.

b. **The Accuracy of the Delivery System.** There are many variables that impact on the accuracy of the weapon. The FSO has the technical knowledge to assist the company commander. Artillery and mortars are area weapons systems, which means that every round fired from the same tube impacts in an area around the target or aiming point. This dispersion is greater in length than in width. The weather conditions (wind, temperature, and humidity), the condition of the weapon, and the proficiency of the crew also affect the accuracy.

c. **The Protection of His Unit as the Rounds are Impacting.** If the unit is in well-prepared defensive positions with overhead cover, an FPF can be adjusted very close, just beyond bursting range. If required, the company commander can even call for artillery fires right on his company position using proximity or time fuzes for airbursts. It is much more dangerous to call for close indirect fires during an attack. The commander considers the terrain, the breach site, and the enemy positions to determine how close to adjust his supporting indirect fires.

d. **The Integration of Indirect Suppressive Fires.** When integrating indirect suppressive fires to support the breach and assault, the following points are key:

(1) The danger increases with the size of the weapons. Use artillery to isolate the objective; use mortars on enemy positions away from the breach site; and use the 60-mm mortars, M203s, and direct fire weapons for close suppression.

(2) Assaulting perpendicular to the gun target (GT) line increases the probability of safety. If the rounds are coming over the head of the assault element, the margin of safety is reduced.

(3) Company mortars firing direct lay or direct alignment are the most responsive system. They are able to observe the rounds' impact and adjust accordingly. The safest method is to fire the 60-mm mortar with a bipod.

(4) Ideally, the firing units register prior to firing close-support missions. If not, the first rounds fired may be off target by a considerable distance. Once the firing units are adjusted on a target, then any shifts from that target are much more reliable.

e. **Timings and Control.** The final requirement for integrating these fires is to establish timings and control to ensure these targets are initiated, adjusted, and shifted properly. If possible, the company FSO should locate where he can observe these targets (possibly with the support element). A detailed execution matrix that assigns responsibility for each target to the leader or observer who is in the best position to control them should be developed. These soldiers must know when each target, series, or group is fired, what effect is desired on which enemy positions, and when to lift or shift the fires. Consider the use of pyrotechnic or other signals to ensure communication.

## 10-16. FIRE SUPPORT TEAM

The following paragraphs examine capabilities, procedures, and other considerations that affect the company FIST and its employment in the fires and effects mission.

a. **Personnel.** FIST personnel at the company level include the company FSO, the fire support sergeant, a fire support specialist, and a radiotelephone operator.

b. **Equipment.** The FIST operates out of the FIST FSV. This FSV is equipped with digital and voice communications links to all available indirect fires and effects assets. The large targeting head atop the FSV houses the G/VLLD, which can accurately determine the range, azimuth, and vertical angle to targets and can designate targets for laser-guided munitions.

c. **FIST Employment.** The company commander has two options for employment of his FIST.

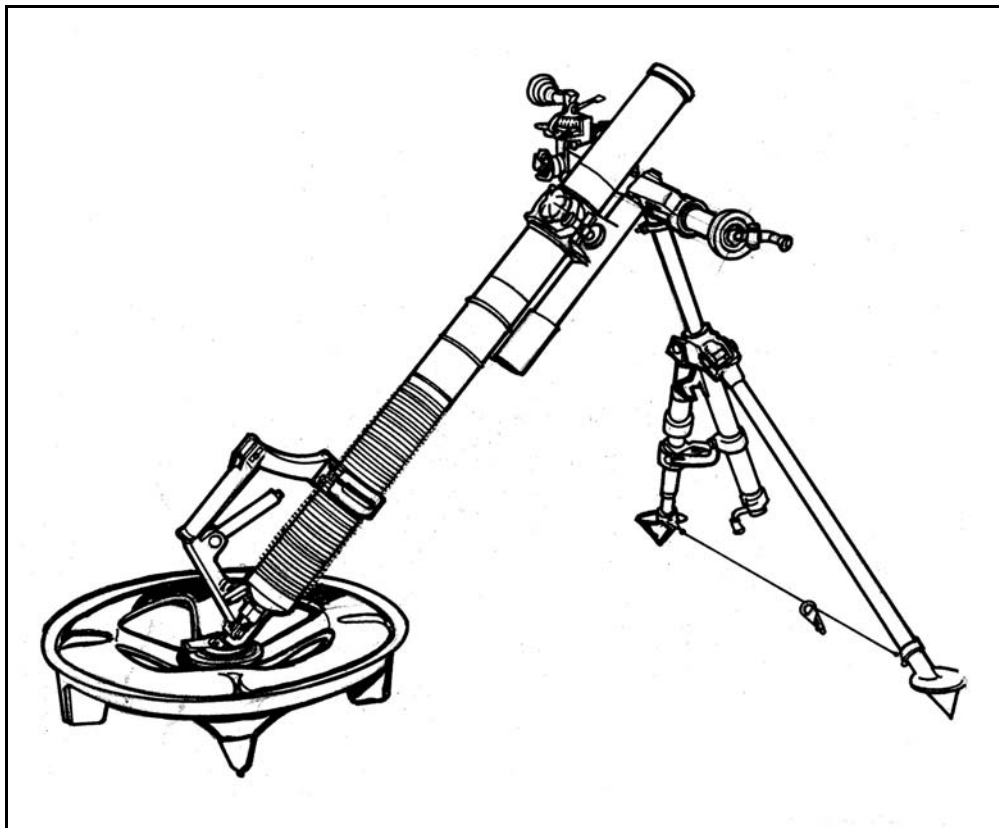
(1) **Option 1.** The FSV is used as a combat observation lasing team (similar to a Striker team) somewhere within the battalion or SBCT sector or zone and is controlled by another headquarters. The company FSO, accompanied by the fire support specialist, rides with the company commander or in another company maneuver vehicle. He brings two radios and the handheld terminal unit (HTU). This option severely degrades the ability of the FIST to support the company.

(2) **Option 2.** The company FSO works out of the FSV, which he positions where he can most effectively observe and control execution of the fire support plan. The FSO establishes OPs that take maximum advantage of the capability of the Striker to create lethal, accurate fires. He communicates with the commander on the company command net. This option allows the FSO to maintain effective control of any designated observers and to conduct required fires and effects coordination. He must keep the company informed at all times of his location and the routes he will take when moving from OP to OP.

## 10-17. MORTARS

The mortar section is made up of two squads, each consisting of two 60-mm mortars or two 120-mm mortars and crew (Figures 10-6 and 10-7). The mortar section leader must work closely with the company commander and his FSO to maximize the section's fires.

The platoon has two vehicles to move its equipment, ammunition, and personnel; it also has an organic FDC. Table 10-6, page 10-26, shows the different ranges and types of ammunition for the company mortar systems. Teamwork is the key to an efficient mortar section. Duties must be constantly drilled and personnel cross-trained.



**Figure 10-6. 60-mm mortar dismounted.**



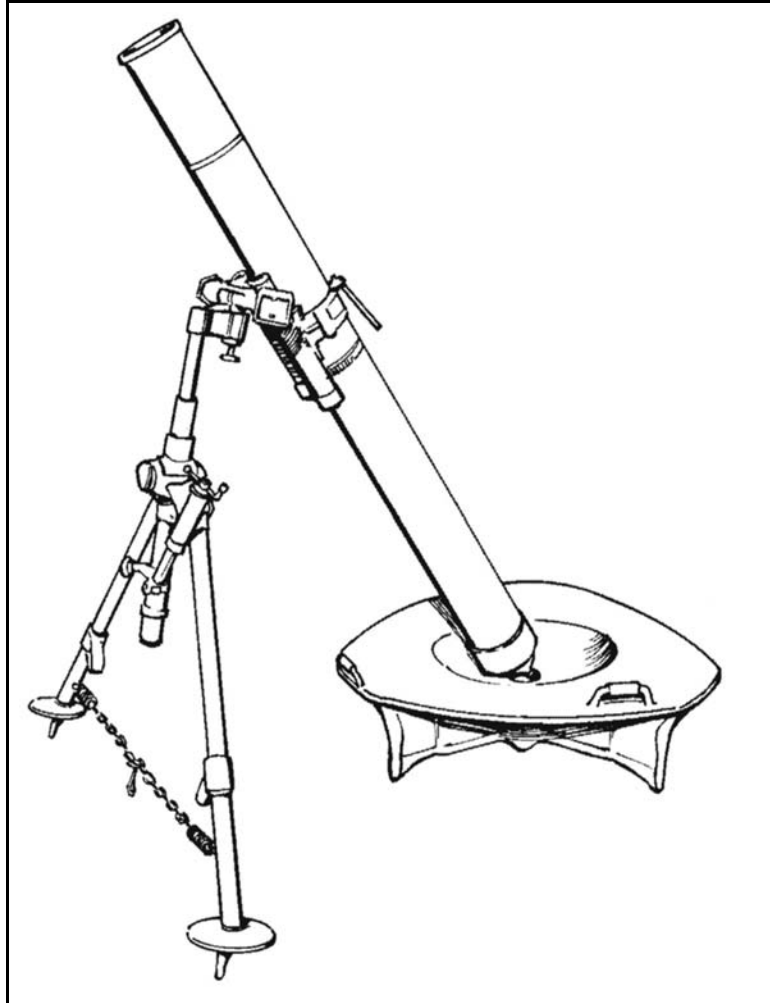


Figure 10-7. 120-mm mortar (dismounted).

SIZE/ NOMEN	MODEL	TYPE	MIN RANGE	MAX RANGE	DIAMETER OF ILLUM	ROF
60-mm M224	M720/M998	HE	70	3500 <sup>(1)</sup>	500	30 RDS PER MINUTE FOR 4 MINUTES <sup>(2)</sup> THEN 20 RDS PER MINUTE SUSTAINED
	M722	WP	70	3500		
	M721	ILLUM	200	3500		
	M302A1	WP	35	1830	300	
	M83A3	ILLUM	725	950		
	M494A	HE	45	1830		
120-mm M121	M57	HE	200	7200	1500	15 RDS PER MINUTE FOR 1 MINUTE, THEN 4 RDS PER MINUTE SUSTAINED
	M68	WP	200	7200		
	M91	ILLUM	200	7100		
	M933	HE (PD)	200	7200		
	M934	HE (MOF)	200	7200		
	M929	WP	200	7200	1500	
	M930	ILLUM	200	7200		
(1) BIPOD MOUNTED, CHARGE 4 (MAXIMUM RANGE HANDHELD IS 1300 METERS).						
(2) CHARGE 2 AND OVER. 30 RDS PER MINUTE CAN BE SUSTAINED WITH CHARGE 0 OR 1.						

**Table 10-6. Mortar ammunition characteristics.**

a. **Mortar Section Leader.** The mortar section leader is responsible (overall) to the company commander for the mortar section. His duties include--

- Advising the commander on employing and positioning the mortar section.
- Assisting the FIST chief in planning fire support for the company.
- Keeping the commander informed of the location of the mortar section and the status of the mortars and ammunition.
- Maintaining a situation map showing all supported units' locations, mortar positions, maximum range lines, and targets.
- Planning, initiating, and supervising the timely displacement of the section.
- Supervising security, resupply, and communications for the section.
- Seeing that preparations are made for special firing techniques, such as direct lay and direct alignment.
- Performing the duties of chief computer.
- Cross-checking target plots.
- Maintaining ammunition records and submitting resupply requests.
- Recommending to the commander when the mortars should displace and controlling their displacement.
- Relaying enemy information from designated observers to the company and others, as directed.

b. **Mortar Squad Leader.** The mortar squad leader and gunners' responsibilities include--

- Moving and positioning the mortar as directed.
- Ensuring that the mortar is properly laid.
- Checking camouflage and overhead and mask clearance.

- Maintaining a map showing positions, sectors, and targets (needed for independent operations or when displacing by squads).
- Computing firing data for independent operations.
- Ensuring that ammunition is properly stored.
- Checking rounds for indexing and charges.
- Maintaining communications with the FDC, when applicable.

#### **10-18. MORTAR POSITIONS**

Based on the mission, terrain, and SBCT infantry rifle company commander's guidance, the mortar section leader reconnoiters and selects mortar firing positions. In the battalion mortar platoon, a representative from the base gun and one man from the FDC may help reconnoiter and prepare the new position.

a. A mortar section position should--

- Allow firing on targets throughout the company's sector or zone, or the supported platoon's sector or zone. In the offense, one half to two thirds of the range of the mortars should be forward of the lead platoon. This reduces the number of moves needed.
- Be in defilade to protect the mortars from enemy observation and direct fire. Places such as the reverse slope of a hill, a deep ditch, the rear of a building, and the rear of a stonewall are well suited for mortar positions. The reverse slope of a hill may protect mortars from some indirect fire.
- Have concealment from air and ground observation. Vegetation is best for breaking up silhouettes. Vehicles should be positioned in defilade where natural camouflage conceals them. When the location of the firing position provides little concealment, consider the use of a hide position, which provides good cover and concealment and allows the mortar crews to quickly occupy their firing positions when required.
- Have overhead and mask clearance. Overhead clearance is checked by setting the sight at maximum elevation and looking along the mortar tube. Mask clearance is checked the same way, but at minimum elevation.
- Have solid ground that supports vehicle movement and precludes excessive settling of base plates. On soft ground, put sandbags under base plates to reduce settling.
- Have 25 to 30 meters between 60-mm mortars and 35 to 40 meters between 120-mm mortars. This reduces the chances of having more than one mortar hit by one enemy round. It also provides proper sheaf dispersion without plotting for each gun.
- Have routes in and out. These routes should ease resupply and displacement.
- Be secure. The section may have to provide its own local security. Being near other friendly units improves security.
- Avoid overhead fire of friendly soldiers when possible.

b. The FDC may be in voice-distance of the squads; however, telephone wire should be laid from the FDC to each squad for security purposes and because battle noise may be so intense that the squads cannot hear the commands.

c. The mortar section has a very limited capability to secure itself. Normally, it collocates with other elements or has a security element attached.

d. Mortar crews prepare mortar positions to protect themselves and to serve as firing positions for the mortars. The crews construct the positions with sandbags, ammunition boxes, earth, or any other available materials. (FM 7-90 describes these dug-in positions.)

### **10-19. MORTAR EMPLOYMENT**

In a movement to contact, the mortar section usually supports the SBCT infantry company with priority of fire to the lead platoon. The section normally displaces one squad at a time so that at least one squad is always in position and ready to fire. The section's displacement is based on the company's movement. The leader keeps the company commander informed of the location and status of his weapons and ammunition. The observers report their locations to the FDC.

a. In an attack, sections prepare initial firing positions and may stockpile ammunition. They occupy positions at the last moment before the attack. The section must remain ready throughout the attack to respond to calls for fire and to displace, if necessary.

b. In the defense, mortars are farther to the rear than in the offense. The company commander plans his mortar section's final protective fire on a dangerous, dismounted enemy avenue of approach. Extra ammunition is stockpiled (if feasible). The mortars have some security when behind forward troops, but they still prepare to defend their positions.

c. To avoid being suppressed, a number of mortar positions are designated, prepared (if feasible), and occupied as required during the battle.

d. In a withdrawal not under enemy pressure, one or more mortars may be left in position to support the DLIC.

e. No matter where the platoon or section is located, it does everything it can for its own security. It may be able to post one or two security elements (equipped with Claymore mines and AT4s) on the most dangerous approaches. It also uses early warning devices. If attacked, the security elements give warning, kill as many of the enemy as they can, and then rejoin their squads. The rest of the unit defends them from the dug-in mortar positions. The company reserve may be employed for a counterattack or to improve the security and defense of the mortar section.

f. The mortar section leader coordinates the section defense plan with the company reserve. Targets are planned around the section's position so other mortars or artillery can provide support.

### **10-20. MORTAR DISPLACEMENT**

Mortars displace to provide continuous support and to evade suppression, whether the company is attacking or defending. This paragraph applies to both 60-mm and 120-mm mortars when man-packed by the platoon or section. (When displacing the 120-mm platoon with vehicles, refer to Chapter 3 of this manual and FM 7-90.)

a. The displacement plan and the position of the mortar section in the company formation should not disrupt the maneuver elements, should be responsive to the commander, and should provide the mortar section with local security. It should also allow the mortars to go into action quickly using the desired method of engagement and should provide ammunition resupply for the mortars. The displacement plan flows

logically from other decisions made by the company commander, the company FSO, and the mortar section leader.

b. If the company commander determines that operations (offensive or defensive) will move slowly enough to stay within mortar range and that continuous indirect fires must be available, he may order the mortars to displace to a suitable support position before the company moves out. In this event, he may not move them again until the company reaches its next position. The choices available for displacement are displacement by section and displacement by squad:

(1) **Displacement by Section.** The whole section displaces at the same time. This allows the section to mass fires and the section sergeant to keep good control of his section. Moving as a platoon or section maximizes the limited FDC capability. It also is the fastest method of displacement. While the section is moving, its fire support is not immediately available unless it is positioned to fire using the direct lay or direct alignment methods or by conducting a hip shoot. Using any of these methods, the mortar section can be available with only minimum delay.

(2) **Displacement by Squad.** This method allows continuous coverage of at least part of the company's sector. Because there is only one radio in the mortar section and six men for the 60-mm, it is difficult to provide continuous indirect fire coverage even when displacing by squad. It is possible, however, for the company to attach one squad to each of two bounding platoons so that while using the direct lay or direct alignment methods, one squad is always in overwatch of the company's movement. This may allow increased mortar coverage of the company sector during decentralized operations. It reduces the difficulty of transporting the mortar ammunition and also may be the most effective means of infiltrating the mortars. Each section carries the ammunition for the attached gun squad.

c. The company commander also decides whether to move the mortars as a separate element in the company formation or to attach each gun squad to a subordinate element.

(1) **Attached.** The mortars are attached to a subordinate element when the situation requires that task organization (on a patrol or with the company support element, for example) or when the mortars need additional control, security, and load-carrying capacity (during an infiltration, for example).

(2) **Separate.** The mortars move as a separate element in the company formation when the commander wishes to control them directly and keep them together for massed use. When the mortars move as an element, they can displace by section or by squad.

## 10-21. MORTAR ENGAGEMENTS

There are various engagement methods: direct lay and direct alignment (which do not require a fire direction center), the conventional indirect fire, and the hip shoot. The primary methods of engagement for the 60-mm mortar are direct lay and direct alignment.

a. **Direct Lay.** This method is used when the gunner can see the target. The mortar may be handheld or bipod-mounted. An initial fire command is required to designate the target and (if desired) specify the shell-fuze combination and number of rounds. The gunner then adjusts fire and fires for effect without additional instructions (Table 10-7, page 10-30).

ADVANTAGES OF DIRECT LAY	DISADVANTAGES OF DIRECT LAY
<ul style="list-style-type: none"> <li>• Can engage target immediately in handheld mode (the mortar weighs only 18 pounds and is therefore highly portable).</li> <li>• Can be used by relatively untrained gunners, such as cross-trained infantrymen.</li> <li>• Does not require an FDC.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires the mortar crew to be relatively close to the enemy and therefore susceptible to direct and indirect fires.</li> <li>• Is less effective at night (the gunner cannot engage when he cannot see).</li> </ul>

**Table 10-7. Advantages and disadvantages of direct lay.**

b. **Direct Alignment.** This method allows the mortar crew to fire from full defilade positions without an FDC. It requires that an observer be within 100 meters of the gun-target line and, if possible, within 100 meters of the guns. Direct alignment can be used only when handheld or bipod-mounted, although bipod-mounted is much more accurate (Table 10-8).

ADVANTAGES OF DIRECT ALIGNMENT	DISADVANTAGES OF DIRECT ALIGNMENT
<ul style="list-style-type: none"> <li>• Can engage target more quickly than the methods requiring an FDC.</li> <li>• Allows crew more protection than direct lay.</li> <li>• Does not require an FDC.</li> </ul>	<ul style="list-style-type: none"> <li>• Is slightly slower than direct lay.</li> <li>• Requires the mortar crew to be relatively close to the enemy and therefore vulnerable to indirect fires or assault.</li> <li>• Requires a well-trained observer to be within 100 meters of the gun-target line (preferably within 100 meters of the guns).</li> <li>• Requires observers to be in direct communication with the gun crew by voice, arm-and-hand signal, landline, or radio.</li> <li>• Requires gun to be re-laid to engage each different target.</li> </ul>

**Table 10-8. Advantages and disadvantages of direct alignment.**

c. **Conventional Indirect Fire.** This method is used when the mortars have been laid for direction and an FDC established with positions plotted on the M16 plotting board or the mortar ballistic computer (MBC). In this situation (for the 60-mm mortar), the section leader operates the MBC or the M16 plotting board and the radio as the FDC (Table 10-9).

ADVANTAGES OF CONVENTIONAL INDIRECT FIRE	DISADVANTAGES OF CONVENTIONAL INDIRECT FIRE
<ul style="list-style-type: none"> <li>• Can fire accurately at any target within range as long as an observer who can communicate with the FDC observes the target.</li> <li>• Can accurately engage plotted targets during limited visibility.</li> <li>• Can locate well away from enemy direct fires.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires an FDC (there is no designated FDC in the light infantry mortar section).</li> <li>• Is not as responsive as direct lay.</li> </ul>

**Table 10-9. Advantages and disadvantages of conventional indirect fire.**

d. **Hip Shoot.** When a call for fire is received during movement and the target cannot be engaged by either the direct lay or direct alignment method, a hip shoot is initiated. A hip shoot is a hasty occupation of a firing position; it requires both an FDC and an observer. The section leader normally acts as the FDC (60-mm only). The observer's corrections may be sent over the radio or by a wire net. The platoon or section leader must quickly determine an azimuth of fire by map inspection. He then gives this direction to the mortar squads. The second squad leader uses the M2 compass (for the 60-mm section) to lay the base mortar. The section leader uses the MBC, the graphical firing scale, or the firing tables to determine the appropriate elevation and charge. He uses either the MBC or the M19 plotting board to refine the firing data based on the observer's corrections. The section leader may use the aiming-point deflection method, depending upon the terrain. The second mortar is laid either by sight-to-sight or M2 compass (Table 10-10).

ADVANTAGES OF HIP SHOOT	DISADVANTAGES OF HIP SHOOT
<ul style="list-style-type: none"> <li>• Allows fire support when other methods of engagement are not usable.</li> <li>• Is able to move at the same time as the unit and still provide adequate fires.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires an FDC (there is no designated FDC in the light infantry mortar section).</li> <li>• Is the slowest method of fire and the least accurate.</li> </ul>

**Table 10-10. Advantages and disadvantages of hip shoot.**

### Section III. ENGINEERS

The two core qualities of the SBCT infantry company are high mobility and the ability to achieve decisive action through dismounted infantry assault. At the tactical level, overmatching mobility is critical to the success of the force. Given the significance of tactical mobility to the SBCT's successful operations, the SBCT engineers are essential.

#### 10-22. ORGANIZATION AND CAPABILITIES

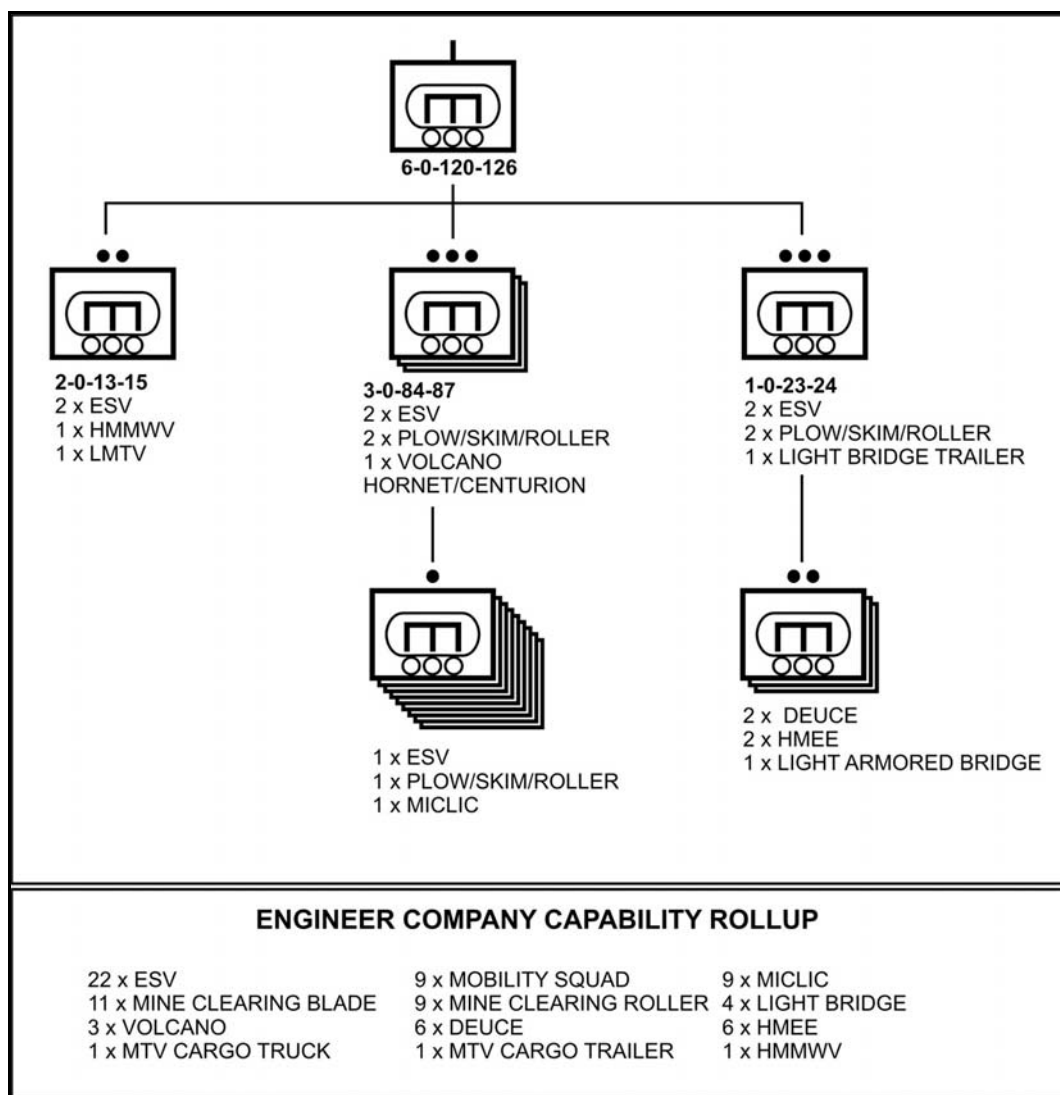
SBCT engineer structure provides the SBCT commander with the embedded engineer integration required to train, rehearse, plan, and execute synchronized mobility operations. This structure includes--

- A four-man staff engineer planning section within the maneuver support cell.
- An organic medium engineer company outfitted with a full complement of engineer equipment adapted to or mounted on the SBCT's common vehicular platform.

#### **10-23. ENGINEER COMPANY, BRIGADE COMBAT TEAM**

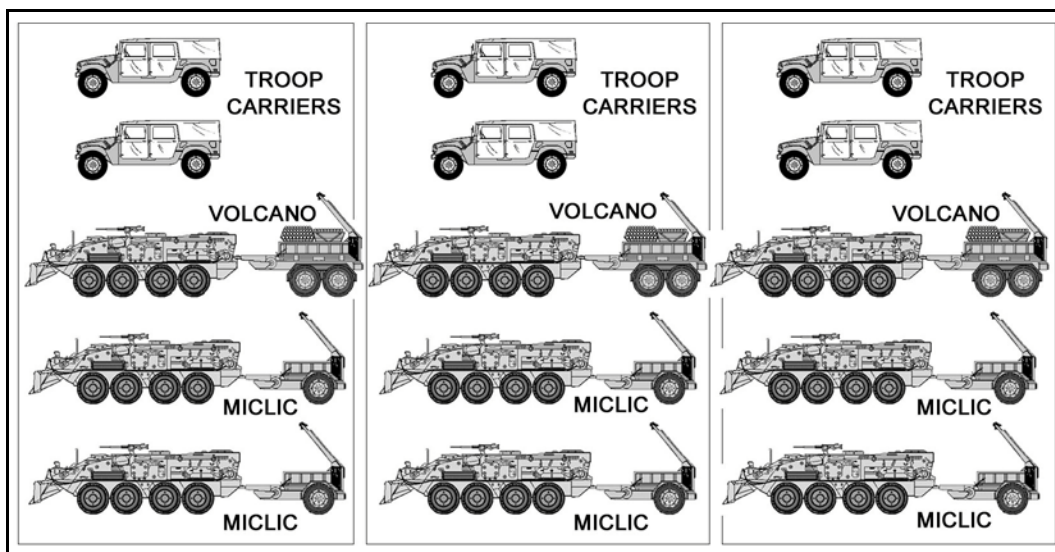
The SBCT's organic engineer company provides embedded, responsive mounted and dismounted maneuver support. The engineer company supports the maneuver force--the SBCT infantry battalions and companies. It readily integrates into maneuver operations and organizations at all levels based on the analysis of tasks required. It is an agile organization that assures freedom to maneuver on the battlefield within the combined-arms-team framework. The engineer company has three combat mobility platoons, one mobility support platoon, and a company headquarters section (Figure 10-8). The engineer company is the lowest engineer echelon organic to the SBCT that can plan and execute continuous 24-hour operations in support of SBCT operations. The engineer company normally task-organizes its platoons to infantry battalions and companies in a specific command-support relationship to provide a mission-specific, tailored package. It performs mounted and dismounted engineer tasks equally well.





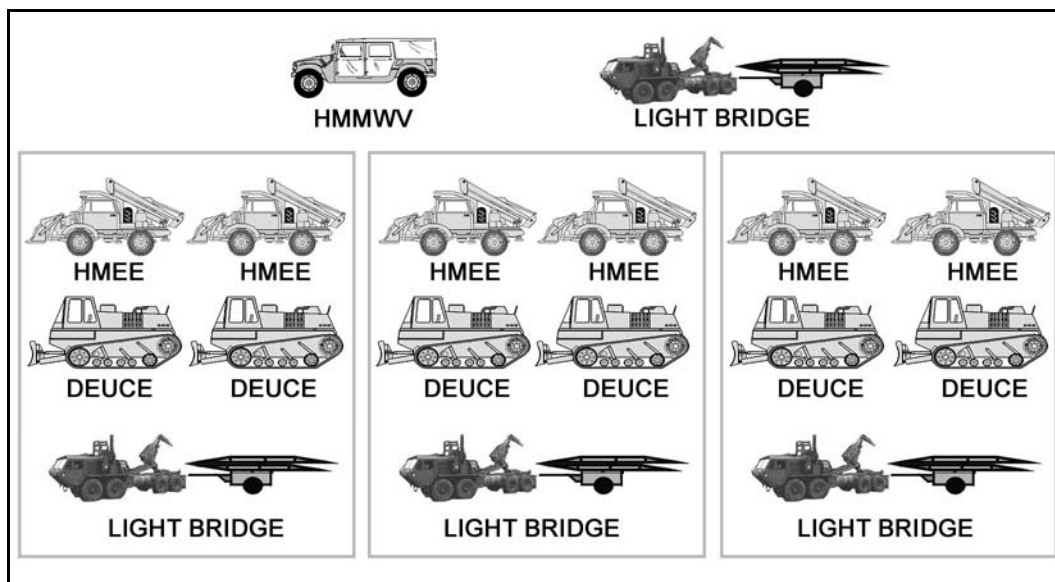
**Figure 10-8. SBCT engineer company organization and equipment.**

a. **Combat Mobility Platoon.** The combat mobility platoon is normally the lowest-level engineer unit that can effectively accomplish independent mounted engineer missions and tasks. It is the basic building block of engineer force allocation and task organization. A combat mobility platoon normally is task-organized to support an infantry battalion, but it may support an infantry company based on METT-TC analysis. The combat mobility platoon may receive augmentation in the form of special equipment from the mobility support platoon. Engineer platoon-specific common-platform equipment includes engineer support vehicles (ESVs) with mountable rollers or blades, light assault bridges, light earthmovers (deployable universal combat earthmovers [DEUCEs]), excavators (HMEEs), MICLICs, and multiple-delivery mine systems (Volcanoes) (Figure 10-9, page 10-34). The combat mobility platoon's eight-man engineer squads carry a variety of explosives and demolitions. The squad is normally the minimum force required to provide effective dismounted support to infantry companies. The squad is the engineer organization most likely to support an infantry company, particularly during offensive operations.



**Figure 10-9. Combat mobility platoon.**

b. **Mobility Support Platoon.** The mobility support platoon consists of a platoon headquarters section and three equipment-based mobility sections (Figure 10-10). Unlike the combat mobility platoon, it is not organized to operate independently during offensive operations. The mobility support platoon provides the commander with specialized equipment capabilities to weight the main effort and to perform specialized mobility tasks. Each section is structured to provide equipment augmentation, focused on reducing enemy obstacles and fortifications, to each of the three combat mobility platoons. Each section has gap-crossing, obstacle-reduction, special-tool, and heavy-blade capabilities. The mobility support platoon provides a limited capability for countermobility, survivability, and sustainment operations.



**Figure 10-10. Mobility Support Platoon.**

#### 10-24. MOBILITY

At the tactical level, overmatching mobility is critical to the success of the force. Within this context, the emphasis of engineer integration across the force is on mobility operations. Due to the full-spectrum capability of the infantry company and the increasingly nonlinear, asymmetric nature of the threat, the potential exists for the company to encounter a wide variety of existing and reinforcing obstacles. To counter this potential threat, the company commander plans, organizes, and prepares to perform mounted and dismounted mobility tasks using the full range of organic and augmentation mobility assets.

a. **Breaching Operations.** Engineers reduce obstacles as part of company breaching operations (FM 3-34.2) and must be prepared to perform mounted and dismounted reduction tasks using manual, mechanical, and explosive reduction means (Table 10-11, page 10-36). Through reverse breach planning, the supporting engineer identifies critical mobility tasks, allocates reduction assets, and recommends a breaching task organization to the company commander. Keys to allocating reduction assets include identifying all reduction tasks within the zone or axis, matching specific reduction assets to each task, and planning redundancy in reduction assets for each task. The breach force must have the capability to secure the breach site locally; therefore, an engineer-based breach force must be task-organized with adequate maneuver combat power to suppress enemy forces in the vicinity of the breach site. The assault force must have the capability to exploit the breach and continue the attack. Keys to synchronizing a breach through reverse planning include:

- Actions on the objective drive the size of the assault force.
- The size of the assault force determines the number and types of breach lanes required.

- The number and types of breach lanes determine composition of the breach force.
- Suppression and obscuration required drives the size and composition of the support force.

BREACHING TENETS	BREACHING FUNDAMENTALS	BREACHING ORGANIZATION	TYPES OF BREACHING OPERATIONS
Intelligence	Suppress	Assault Force	Assault
Breaching Fundamentals	Obscure	Breach Force	Covert
Breaching Organization	Secure	Support Force	In-Stride
Mass	Reduce		Deliberate
Synchronization	Assault		

**Table 10-11. Key breaching doctrine.**

During the breach planning process, it is imperative that the SBCT infantry company commander establishes clear commitment criteria for the breach force. The commitment criteria should be as specific and measurable as possible so that they are clear, executable, and reportable. Sub-unit instructions or SOPs should likewise be clear and concise and should cover all potential actions and reactions. Leaders must position to quickly assess the success of the force in setting the prescribed conditions. To ensure success, all units must perform detailed combined-arms breach rehearsals, whether mounted or dismounted.

b. **Route Clearance Operations.** The nature of SBCT operations makes route clearance a likely task at all levels. Route clearance is a combined-arms operation normally assigned to an infantry battalion or company that is task-organized with engineers and other CS and CSS assets as required. As such, it requires the detailed integration and synchronization found in typical breaching operations. (For a detailed discussion of route clearance operations, refer to FM 5-7-30, FM 20-32, and FM 5-71-2.)

c. **Mobility Planning in the Defense.** Mobility operations in the defense ensure the ability to reposition forces, delay, and counterattack. Because of the mobile, offensive nature of the force, mobility planning is a key component of any defensive scheme of maneuver. The commander analyzes the scheme of maneuver, obstacle plan, and terrain to determine mobility requirements. Critical considerations may include--

- Lanes and gaps in the obstacle plan.
- Lane closure plan and sub-unit responsibility.
- Route reconnaissance, improvement, and maintenance.

## 10-25. COUNTERMOBILITY

Due to the austere engineer force structure, the SBCT infantry battalion engineer performs the majority of obstacle planning and provides detailed integration and resourcing information to the infantry companies in the battalion OPORD. He plans obstacles for both offensive and defensive operations. In either situation, the engineer uses obstacles to develop engagement areas, protect friendly vulnerabilities, and

counteract enemy reactions to friendly maneuver. Because of the mobile nature of the force and the inherently asymmetric, nonlinear environment in which it operates, the engineer relies primarily on scatterable, remotely delivered minefield systems to shape the battlefield. To the infantry company, this normally means integrating ground Volcano and MOPMS into the obstacle plan. The SBCT or battalion engineer designs and resources tactical obstacle groups which companies integrate with direct and indirect fires and construct with engineer support. Obstacle groups consist of one or more individual obstacles that, when integrated with direct and indirect fires, achieve a specific effect (disrupt, fix, block, or turn). The obstacle plan must support the scheme of maneuver, maximize subordinate flexibility, and facilitate future operations.

a. **Obstacle Planning Process.** The obstacle planning process is an integral part of developing both offensive and defensive COAs. It correlates directly with sub-unit maneuver and positioning, engagement area development, and enemy actions. It includes these key components:

- Direct and indirect fires analysis.
- Obstacle intent integration (target, effect, relative location).
- Method of emplacement (conventional or scatterable).
- Obstacle effect priority.
- Mobility requirements.
- Obstacle design and resourcing.
- Marking and reporting obstacle locations.

b. **Barrier Material Resupply.** The S4 normally determines the method (tailgate, service station, or supply point) and location for performing Class IV and V material resupply during the MDMP. He provides resource quantities and tentative resupply node (Class IV and V point and mine dump) locations to companies in the OPORD. SBCT infantry company commanders then analyze resources and mine dump locations based on physical reconnaissance of their AO. Afterwards, the commander submits the results of this refinement to the S4 for adjustment as early as possible.

c. **Mine Dump Operations.** Mine dumps normally contain resources for a single obstacle group but may contain resources for individual obstacles if the distances between obstacles in a group are excessive and would potentially waste an inordinate amount of transportation time. The company commander, in coordination with the supporting engineer, locates the mine dump(s) where they best support obstacle construction within the AO. If a company is assigned more than one obstacle group, it may have more than one mine dump. In light of the austere engineer organization within the force, it is imperative that SBCT infantry companies provide leadership and manpower to operate the mine dump, allowing engineers to construct tactical obstacles more efficiently. This requires close coordination with the supporting engineer.

d. **Obstacle Intent.** Obstacle intent provides a simple framework for the commander to issue guidance and facilitates common understanding and coordination between maneuver and engineer forces. It is at the foundation of the obstacle integration process and includes three components: target, obstacle effect, and relative location.

(1) The *target* is the enemy force that the commander wants to affect with fires and tactical obstacles. The commander identifies the target in terms of size, type, echelon, avenue of approach, or any combination of these.

(2) The *obstacle effect* (see Table 5-1, page 5-11) describes how the commander wants to attack enemy maneuver with obstacles and fires. Tactical obstacles block, turn, fix, or disrupt the enemy. The obstacle effect drives integration by focusing the relationship between obstacles and direct and indirect fires.

(3) The *relative location* is where the commander wants the obstacle effect to occur against the targeted enemy force. Whenever possible, the commander identifies the location relative to the terrain and maneuver or fire control measures to initiate the obstacle integration process.

e. **Scatterable Mines.** Scatterable mines (SCATMINES) are remotely delivered or dispensed by aircraft, artillery, missile, or ground dispenser and laid without pattern. All US SCATMINES have a limited active life and self-destruct after that life has expired. The duration of the active life varies with the type of delivery system and mine. SCATMINES provide the commander with a means to respond to a changing enemy situation with remotely delivered minefields. They enable the commander to emplace minefields rapidly in enemy-held territories, to close lanes in obstacles, and to emplace in other areas where it is difficult for engineers to emplace conventional minefields quickly.

(1) **Scatterable Mine Emplacement Authority.** The corps commander has emplacement authority for all SCATMINES within the corps AO. He may delegate this authority to lower echelons according to the guidelines contained in Table 10-12.

SYSTEM CHARACTERISTICS	EMPLACEMENT AUTHORITY
Ground- or artillery-delivered, with SD time greater than 48 hours (long duration).	The corps commander may delegate emplacement authority to division level, which may further delegate to brigade level.
Ground- or artillery-delivered, with SD time of 48 hours or less (short duration)	The corps commander may delegate emplacement authority to division level, which may further delegate to brigade level (which may further delegate to battalion level).
Aircraft-delivered (Gator), regardless of SD time.	Emplacement authority is normally at corps, theater, or army command level, depending on who has air-tasking authority.
Helicopter-delivered (Volcano), regardless of SD time.	Emplacement authority is normally delegated no lower than the commander who has command authority over the emplacing aircraft.
MOPMS when used strictly for a protective minefield.	Emplacement authority is usually granted to the company or base commander. Commanders at higher levels restrict MOPMS use only as necessary to support their operations.

**Table 10-12. Emplacement authority.**

(2) **Scatterable Mine Minefield Warning.** The executing unit sends a SCATMINE warning (SCATMINWARN) to all affected units before, or immediately after, the emplacement of the minefield (Table 10-13). The SCATMINWARN should be disseminated over command nets at all levels to all units operating in the area of the minefield during current and future operations. Absolutely critical components of the SCATMINWARN include the cornerpoint locations, size of safety zone, and self-destruct time.

Line	Message
Alpha	Emplacing system
Bravo	AT (Yes or No)
Charlie	AP (Yes or No)
Delta	4 aim or corner points
Echo	Grid coordinates of aim points/corner points and size of the safety zone
Foxtrot	DTG of the life cycle

**Table 10-13. SCATMINEWARN.**

**(3) Scatterable Mine Delivery Systems.**

(a) *Area-Denial Artillery Munitions (Field Artillery Delivered)*. The wedge-shaped ADAM is a bounding-fragmentation mine that deploys up to seven tension-activated trip wires 6 meters away from the mine. After ground impact, trip wires are released and the mine is fully armed. The lethal casualty radius is between 6 and 10 meters.

(b) *Remote Antiarmor Mines (Field Artillery Delivered)*. The RAAM mine has a cylindrical shape and provides a full-width or catastrophic kill (K-kill). Using a magnetically influenced fuze, the mine projects a bi-directional, shaped-charge warhead through the crew compartment of a vehicle.

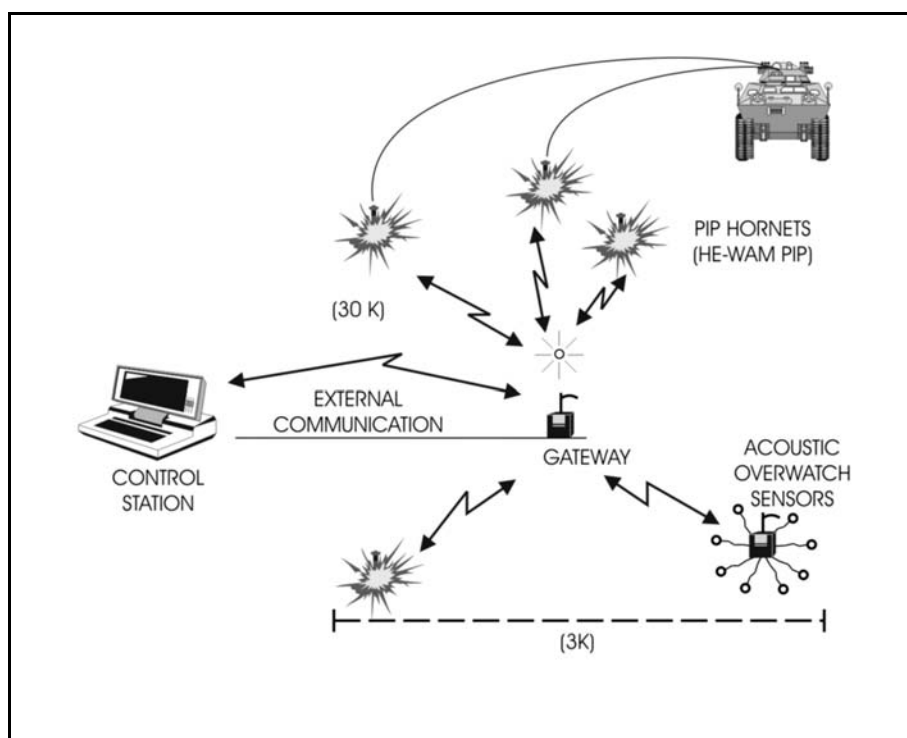
(c) *Multiple Delivery Mine System, or Volcano (Ground or Air Delivered)*. The Volcano is mounted on an ICV, cargo truck, or UH-60A Blackhawk helicopter. The Volcano dispenses mines with 4-hour, 48-hour, and 15-day self-destruct (SD) times. The SD times are field-selectable before dispensing and do not require a change or modification to the mine canister. Reload time (not including movement time to the reload site) for an experienced four-man crew is approximately 20 minutes. The average time to emplace one ground Volcano load (160 canisters) is 10 minutes.

(d) *Modular Pack Mine System (Man-Portable)*. The MOPMS is a man-portable, 162-pound, suitcase-shaped mine dispenser. The dispenser contains 21 mines (17 AT and 4 AP). When dispensed, an explosive propelling charge at the bottom of each tube expels mines through the container roof. Mines are propelled 35 meters from the container in a 180-degree semicircle. The safety zone around one container is 55 meters to the front and sides and 20 meters to the rear. Mines are dispensed on command using an M71 remote-control unit (RCU) or an electronic initiating device with firing wire. Once mines are dispensed, they cannot be recovered or reused. If mines are not dispensed, the container may be disarmed and recovered for later use. The RCU can recycle the 4-hour SD time of the mines three times, for a total duration of approximately 13 hours. The RCU can also self-destruct mines on command, allowing a unit to counterattack or withdraw through the minefield. The RCU can control up to 15 MOPMS containers or groups of MOPMS containers from a distance of 300 to 1,000 meters.

(e) *Raptor/Hornet (Man-Portable)*. The Raptor/Hornet wide area mine introduces an entirely new obstacle concept to the combined-arms company. The Raptor/Hornet is an integrated C2/top-attack special munition that type-categorizes, reports, and engages individual vehicles (Figure 10-11, page 10-40). The Raptor is a “smart” remote combat outpost that can provide the force with near-real-time situational understanding and can command and control multiple Hornet mines in a fully integrated obstacle network. It can be programmed to command and control coordinated attacks with other Raptor-controlled

minefields or with direct and indirect fire weapons systems. The Raptor/Hornet can be deactivated, allowing freedom of maneuver through the minefield while still providing near-real-time intelligence and situational understanding. The Raptor/Hornet has standoff detection and engagement capabilities. It attacks from the side or top at ranges up to 100 meters. The Raptor/Hornet--

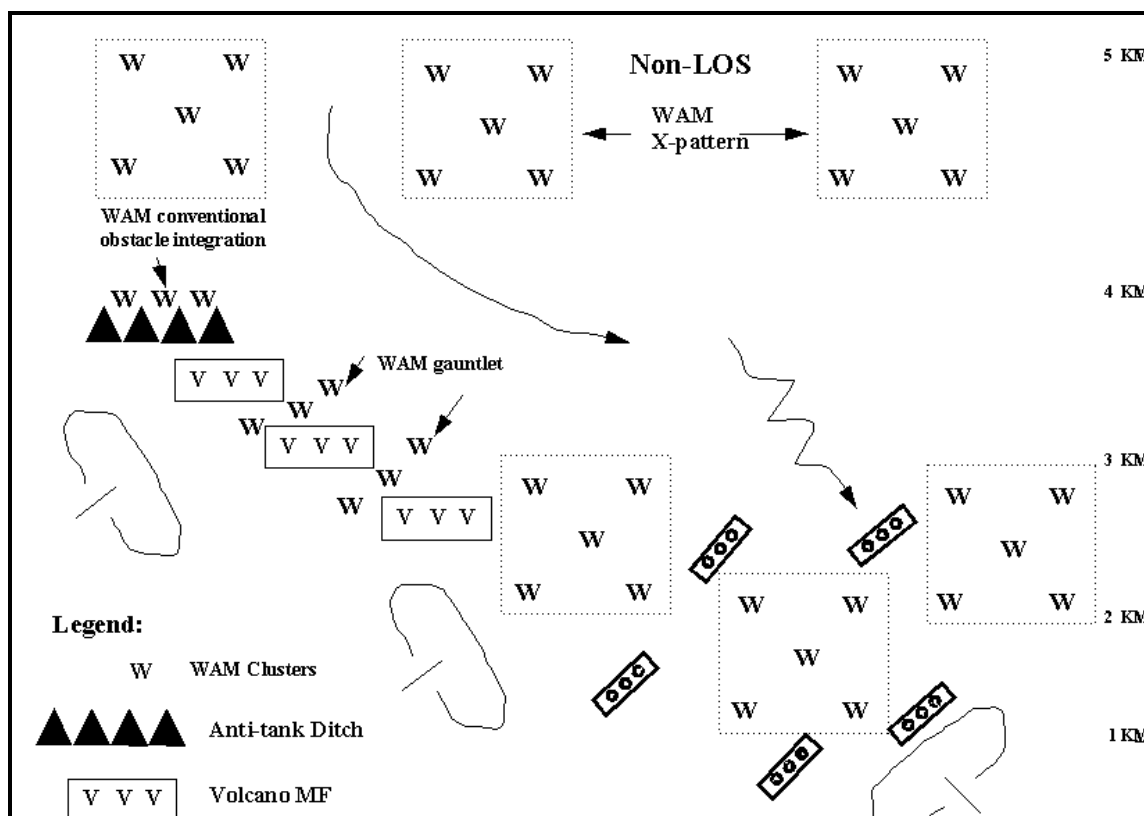
- Can be a stand-alone tactical obstacle or can reinforce other conventional obstacles.
- Disrupts and delays the enemy, allowing long-range, precision weapons to engage more effectively. (This feature is particularly effective in non-LOS engagements.)
- Can communicate with its employing unit for remote on/off/on or program and battlespace intelligence reporting. The battlespace intelligence data may include target descriptions, numbers, and the direction and rate of movement. It also can provide an early warning of the enemy's activity.
- Can communicate with other munitions for conducting coordinated attacks.



**Figure 10-11. Raptor/Hornet concept.**

(4) **Scatterable Mine Marking.** The emplacing unit is responsible for marking a SCATMINE (Figure 10-12). This requires direct coordination between the owning maneuver unit and the delivering or emplacing unit. This requirement specifically applies to MOPMS, Volcano (ground-delivered), and Raptor/Hornet minefields. Minefields should be marked on four sides if emplaced to the rear of any friendly unit, including scouts and other units that may require a rearward passage of lines (RPOL).





**Figure 10-12. SCATMINE marking.**

(a) *Safety Zones*. A safety zone is the area where mines may land and activate outside of the planned dimensions of a SCATMINE. The commander must prevent friendly forces from maneuvering into the safety zone during the minefield's life cycle. Depending on its specific location on the battlefield, the safety zone may be marked with a fence.

(b) *Fragment Hazard Zones*. If a SCATMINE antiarmor mine lands and activates on its side and self-destructs, the resulting detonation may cause the shaped-charge to travel along a horizontal trajectory. The maximum fragment hazard zone for all US SCATMINE systems is approximately 640 meters. However, the acceptable risk distance is 235 meters from the outer edges of the minefield's safety zone for troops in the open (Table 10-14, page 10-42).

System	Safety Zone	Fragment Hazard Zone
ADAM/RAAM	500 to 1,500 meters from aim point(s) (depends on delivery method)	235 meters from the outside dimensions of the safety zone
Gator	925 x 475 meters from aim point(s)	1,395 x 945 meters from aim point(s)
Ground Volcano	1,150 x 160 meters	235 meters from start and stop points and the center line
Air Volcano	1,915 x 200 meters	235 meters from start and stop points and the center line
MOPMS	See FM 20-32, Figures 3-15 through 3-17, for specific placement.	235 meters from the outside dimensions of the safety zone

**Table 10-14. Safety and fragment hazard zones.**

### 10-26. SURVIVABILITY

Survivability operations protect the force. The SBCT infantry company commander plans, prioritizes, and enforces the survivability effort. The plan should specify the following:

- Level of survivability for each sub-unit position.
- Priority of survivability support by specific unit, type of weapon system, or combination.
- Type of position to be dug for a unit or type of system.
- Sequence and time allocated for platoons to receive blade support.

Additional considerations for survivability planning include command and control of digging assets, site security, CSS (fuel, maintenance, and Class I), and movement times between BPs. The commander should start the survivability effort as soon as practical. He may employ blade assets to support systems such as mortars, C2, and key weapons before the bulk of his combat systems are ready for survivability support. The commander should establish a NLT time or a directed time to be ready for survivability. This helps prevent waste of blade time. Companies prepare their area for the arrival of the blades by marking vehicle positions, identifying leaders to supervise position construction, and designating guides for the blade movement between positions.




## Section IV. AIR DEFENSE ARTILLERY

The air defense and aviation coordination cell's (ADACC's) air and missile defense (AMD) analysis determines if the SBCT will be task-organized with air defense assets from a divisional short-range air defense (SHORAD) battalion. Even if the SBCT, and, subsequently the SBCT infantry battalion, receives air defense assets, it is unlikely that the SBCT infantry company will be task-organized with any of the air defense assets. However, Avengers and Linebackers may operate in and around the company AO in support of battalion and brigade assets. Therefore, the company must conduct its own air defense operations, relying on disciplined passive air defense measures and the ability to actively engage aerial platforms with organic weapons systems.

### 10-27. SYSTEMS, ORGANIZATION, AND CAPABILITIES

The systems that may operate in and adjacent to the company AO are the Avenger and Linebacker (Table 10-15). All systems can operate as man-portable air defense system

(MANPADS) or Stinger teams. A maneuver battalion normally is task organized with an air defense platoon equipped with four Avengers or Bradley Linebacker firing units. The company may have an air defense section moving with it; however, this section normally remains part of the air defense platoon, responsible for providing DS, GS, or general support-reinforcing (GS-R) coverage to the battalion.

<p><b>Man-Portable System</b></p> 	<p><b>Personnel:</b> 2-man crew  <b>Basic load:</b> 6 missiles basic load  w/ M998 HMMWV  <b>Acquisition/range:</b> Visual  <b>Engagement range:</b> 5 km  <b>Engagement altitude:</b> 3 km +  <b>Mutual support:</b> 2 km +</p>
<p><b>Bradley Linebacker</b></p> 	<p><b>Personnel:</b> 4-man crew  <b>Basic load:</b> 10 missiles (4 ready to fire, 6 stowed)  <b>Acquisition/range:</b> Visual/thermal  <b>Engagement range:</b> 5 km (Stinger), 2500 m 25-mm, 900 m coax  <b>Engagement altitude:</b> 3 km +  <b>Mutual support:</b> 3 km  <b>Emplacement time:</b> Fire on the move  <b>Reload time:</b> 4 minutes</p>
<p><b>Avenger</b></p> 	<p><b>Personnel:</b> 2 man crew  <b>Basic load:</b> 8 ready-to-fire missiles, 250 rds .50 cal  <b>Acquisition/range:</b> Visual/FLIR 9-10 km, laser range finder  <b>Engagement range:</b> 5 km +, .50 cal range: 6,470 m  <b>Rate of fire:</b> 1025 rpm  <b>Engagement altitude:</b> 3 km +  <b>Mutual support:</b> 3 km  <b>Emplacement time:</b> 6 minutes, can remote operations out to 50 meters</p>

**Table 10-15. Air defense systems.**

### 10-28. EMPLOYMENT OF AIR DEFENSE SYSTEMS

In offensive situations, Avenger and Bradley Linebacker units accompany the main attack. They may maneuver with the battalion's lead companies, orienting on low-altitude air avenues of approach. When the unit is moving or in a situation that entails short halts, the Bradley's primary weapon is the 25-mm chain gun, which has an effective range of 2,000 meters. Consequently, to assure mutual support, Linebackers maneuver no farther than 1,000 meters away from other company elements. The Stinger gunners can dismount to provide air defense when the unit reaches the objective or pauses during the attack. In

the defense, Avenger Bradley Linebacker units establish BPs based on available IPB information and the company commander's scheme of maneuver. Squads are positioned approximately 2 kilometers apart to maximize the air defense vehicles' defensive capabilities. Avengers and Linebackers are often used to protect counterattacking maneuver units that are vulnerable to detection and attack by enemy air forces.

#### **10-29. WEAPONS CONTROL STATUS**

The weapons control status (WCS) describes the relative degree of control in effect for air defense fires. It applies to all weapons systems. The weapons control status is dictated in the battalion OPORD and may be updated based on the situation. The three levels of control are--

- a. **Weapons Free.** Crews can fire at any air target not positively identified as friendly. This is the least restrictive weapons control status level.
- b. **Weapons Tight.** Crews can fire only at air targets positively identified as hostile according to the prevailing hostile criteria.
- c. **Weapons Hold.** Crews are prohibited from firing except in self-defense or in response to a formal order. This is the most restrictive control status level.

#### **10-30. EARLY WARNING PROCEDURES**

Air defense warnings (ADWs) include--

- RED - Air or missile attack imminent or in progress.
- YELLOW - Air or missile attack probable.
- WHITE - Air or missile attack not likely.

While air defense warnings cover the probability of hostile air action over the entire theater of war or operations, local air defense warnings describe with certainty the air threat for a specific part of the battlefield. Air defense units use these local warnings to alert Army units to the state of the air threat in terms of "right here, right now." There are three local air defense warning levels:

- DYNAMITE - Air platforms are inbound or are attacking locally now.
- LOOKOUT - Air platforms are in the area of interest but are not threatening. They may be inbound, but there is time to react.
- SNOWMAN - No air platforms pose a threat at this time.

**NOTE:** The area air defense commander routinely issues air defense warnings for dissemination throughout the theater of war or operations. These warnings describe the general state of the probable air threat and apply to the entire area.

#### **10-31. REACTION PROCEDURES**

Reaction procedures include both passive and active air defense measures.

- a. **Passive Air Defense.** Passive air defense consists of all measures taken to prevent the enemy from detecting or locating the unit, to minimize the target acquisition capability of enemy aircraft, and to limit damage to the unit if it comes under air attack. One advantage the company can exploit is that target detection and acquisition are difficult for crews of high-performance aircraft. In most cases, enemy pilots must be able to see and identify a target before they can launch an attack.

(1) **Guidelines.** The SBCT infantry company should follow these guidelines to avoid detection or limit damage:

- When stopped, occupy positions that offer cover and concealment; dig in and camouflage vehicles that are exposed. When moving, use covered and concealed routes.
- Disperse vehicles as much as possible to make detection and attack more difficult.
- Wipe out track marks leading to vehicle positions and eliminate or cover the spoil from dug-in positions.
- If moving when an enemy aircraft attacks, disperse and seek covered and concealed positions.
- Do not fire on a hostile fixed-wing aircraft unless it is clear that the aircraft has identified friendly elements. Premature engagement compromises friendly positions.
- Designate air guards for every vehicle and position; establish and maintain 360-degree security.
- Establish an air warning system in the unit SOP, including both visual and audible signals.

(2) **Procedures.** When the company observes fixed-wing aircraft, helicopters, or UAVs that could influence its mission, it initially takes passive air defense measures unless the situation requires immediate active measures. This reaction normally takes the form of each platoon's React to Air Attack battle drill; however, the commander can initiate specific passive measures if necessary. Refer to the passive air defense guidelines for the company discussed earlier in this section.

**NOTE:** Passive air defense also includes the company's preparations for conducting active air defense measures.

Passive air defense involves these three steps:

- (a) Step 1 - Alert the company with a contact report.
- (b) Step 2 - Deploy or take the appropriate actions. If the company is not in the direct path of an attacking aircraft, the commander or platoon leaders order vehicles to seek cover and concealment and halt with at least a 100-meter interval between vehicles. They also may be ordered to continue moving as part of the battalion.
- (c) Step 3 - Prepare to engage. Fighting vehicle crews prepare to engage the aircraft with machine gun or main gun fire on order of the commander or their platoon leader.

b. **Active Air Defense.** If the commander determines that the SBCT infantry company is in the direct path of attacking aircraft, he initiates active air defense procedures, including React to Air Attack drills by the company's platoons. Active air defense entails the following steps:

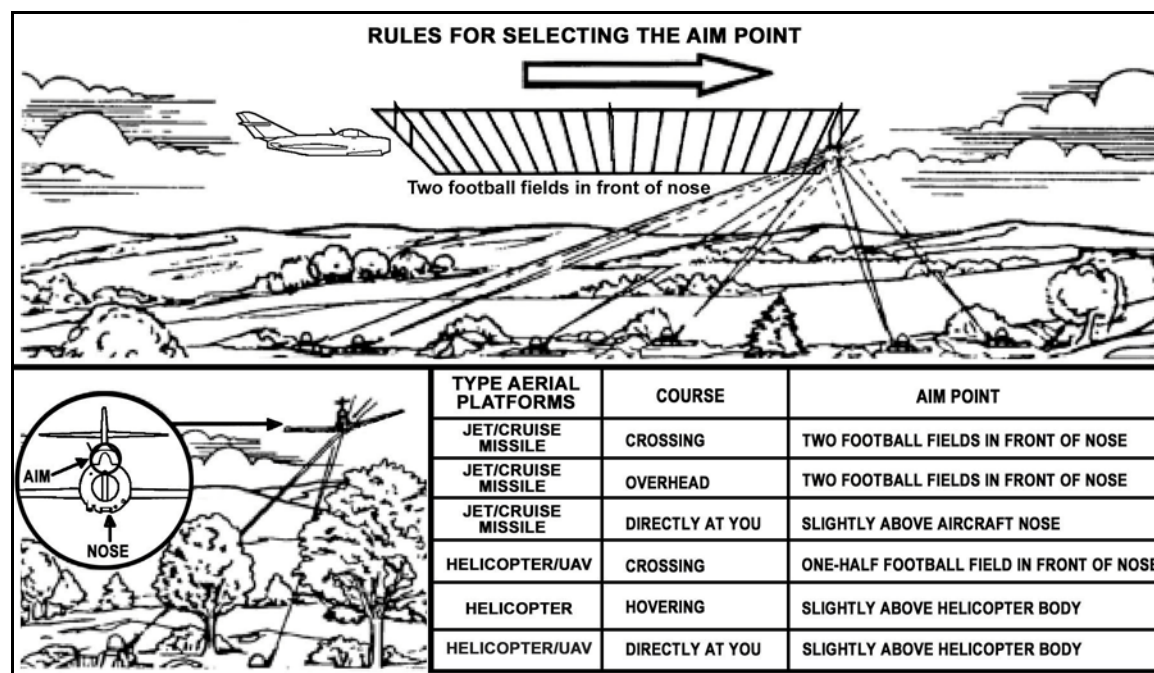
- (1) Step 1 - Initiate fires. The primary intent is to force aircraft to take self-defense measures that alter their attack profile and reduce their effectiveness. Leaders may use a tracer burst to designate an aim point for machine gun antiaircraft fires (see Figure 10-13, page 10-46). Volume is the key to effectiveness; ICVs and MGSs throw up a "wall of steel" through which aircraft must fly. The MGS main gun and Javelin missiles are effective in company air defense employment against hovering attack helicopters; the

MGS main gun and ICV M2s are effective against moving helicopters, and the tank main gun multipurpose antitank (MPAT) round is effective against high-performance aircraft.

(2) Step 2 - Create a nonlinear target. Vehicles move as fast as possible at a 45-degree angle away from the path of flight and toward attacking aircraft. Each platoon maintains an interval of at least 100 meters between vehicles, forcing aircraft to make several passes to engage the entire platoon.

(3) Step 3 - Move quickly to covered and concealed positions and stop. Vehicles freeze their movement for at least 60 seconds after the last flight of aircraft has passed.

(4) Step 4 - Send a spot report (SPOTREP). The company commander or XO updates the battalion commander on the situation as soon as possible.



**Figure 10-13. Machine-gun aim points against helicopters and high-performance aircraft.**

## Section V. NBC SUPPORT

NBC assets within the SBCT are limited; therefore, it is imperative that the companies practice the fundamentals of NBC defense, avoidance, protection, and decontamination in order to survive on a contaminated battlefield.

### 10-32. RECONNAISSANCE SUPPORT

The NBC reconnaissance platoon organic to the RSTA squadron is the only internal NBC reconnaissance available to the SBCT. The NBC reconnaissance platoon can locate, identify, and mark areas of contamination. Since NBC reconnaissance assets are limited, the SBCT infantry company commander must plan for alternate means of conducting NBC reconnaissance (such as scouts and MPs).

**10-33. DECONTAMINATION SUPPORT**

External decontamination support is not available at the company level. For operational decontamination, the SBCT infantry company must request support from the SBCT infantry battalion decontamination team, which is equipped with the modular decontamination system (MDS). Thorough decontamination operations require the support of an external decontamination platoon. The company must request this support through the SBCT infantry battalion and SBCT S3 sections. The contaminated company will be tasked to augment the decontamination platoon during the conduct of thorough decontamination operations. (For a more detailed discussion of decontamination requirements, refer to FM 3-5).